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SYNOPSIS

OF THE

COURSE OF LECTURES

ON

MATERIA MEDICA AND PHARMACY.

DELIVERED IN THE

UNIVERSITY OF PENNSYLVANIA.

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WITH

THREE LECTURES ON THE MODUS OPERANDI OF MEDICINES.

BY

JOSEPH CARSON, M.D.

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TO THE

STUDENTS OF MEDICINE

OF THE

University of Pennsylvania,

FOR

WHOSE ESPECIAL USE IT HAS BEEN PREPARED, AND WITH THE EARNEST DESIRE

THAT IT MAY LIGHTEN THEIR LABOR AND PROMOTE THEIR ADVANCEMENT,

THIS WORK

IS AFFECTIONATELY INSCRIBED,

BY

THE AUTHOR.

30237

PREFATORY NOTICE.

THE following outlines of the Lectures on Materia Medica and Pharmacy have been prepared, that the Student, attending the course, may possess a guide to the leading facts and principles comprised in so extended a subject.

No doubt can exist with respect to the advantages of such assistance. The strongest memory finds difficulty in appropriating all that is communicated by oral instruction, and many important points are lost to the generality of students. The text-books which treat of the same department pursue neither the order nor the method presented in the lectures, and loss of time is entailed by reading all that is relevant or irrelevant to the portion of the subject under consideration at any given period. The *United States Dispensatory*, and Pereira's *Elements of Materia Medica*, have been recommended in connection with the course; but so extensive is their range that they are scarcely adapted for the momentary requisitions of the student.

In the synopsis here given, a framework is afforded which may, with ordinary industry, be filled in by notes taken at the time the lectures are delivered, or by refer-

ence to the works specified. In the latter way much can be accomplished in the interim of the courses.

The motive which has influenced me in compiling the work from my manuscript notes, is the desire to give the pupils of the University a thorough knowledge of the important branch of medicine which it is my duty to teach. To the character of an independent treatise the work presents no claim; in fact, a large proportion of it requires the explanations given in the lecture room.

There have been added to this edition three lectures upon the modus operandi of medicines. These lectures comprise the results of investigation with respect to the part taken by the nervous system in the action of medicines, and the proofs of absorption. They have been printed in full, in order that the student may have the opportunity of dwelling leisurely upon this complicated and most difficult part of the branch of Materia Medica, and to save the necessity of extended oral delivery. In this edition the names of the medicinal articles and their preparations have been made to conform to the United States Pharmacopœia of 1863.

With the hope that the work may prove serviceable, it has been inscribed to those in whose welfare I have the highest interest, and for whose benefit the labor of teaching becomes a pleasing occupation.

October, 1863.

MATERIA MEDICA.

INTRODUCTORY OBSERVATIONS.

THE SCIENCE OF MEDICINE has for its object the alleviation and cure of disease. Two kinds of agents are employed, MORAL and PHYSICAL, the study and investigation of which constitute ACOLOGY, or the *Science of Remedies.*

MORAL agents are employed to impress the mind and feelings, and are not to be overlooked by physicians; while physical agents are employed to act upon the body, and remove corporeal ailments.

PHYSICAL agents are derived from the material world in which we dwell. Some of them are absolutely necessary for the maintenance of life, and by proper management can be made to play an important part in the treatment of diseases; they come under the head of *Hygienic* Remedies. Others consist of substances found abundantly in the three kingdoms of nature, the Animal, the Vegetable, and the Mineral, which have been proved by observation and experience to have a decided controlling or perturbating influence over the organs of the body. These constitute the MATERIA MEDICA.

There are other agents which are mechanical in their application, but which so influence vital movements as to be important in diseased states; as venesection, issues, setons, acupuncture, &c.

A knowledge of the power and the application of remedies is the foundation of Therapeutics.

The term PHARMACOLOGY is employed for that of Materia

Medica. It is more comprehensive. The articles of the Materia Medica, whether simple or modified, are called *Medicines*. PHARMACY is the art of preparing them for use; and by THERAPEUTICS is meant the application, guided by principles, which is made of them in the treatment of disease. PHARMACOLOGY embraces all of these subjects.

Medicines may be defined to be substances, derived from the organic and inorganic kingdoms, which inherently possess the power of affecting the solids and fluids of the body, and, through them, so changing the functional and organic movements as to be serviceable in diseased conditions.

Some articles of Diet will be found in the list of the Materia Medica, which have been there placed for convenience, in consequence of their adaptation to diseased states of the organs. A distinction is to be drawn between an article of food and a medicine; it depends essentially upon the assimilative capabilities of the former;—exceptions.

A distinction is also to be drawn between a *medicine* and a *poison*. This is more difficult, as medicines may become poisons, or poisons may be used as medicines. It is the application which determines whether articles of the materia medica are to be regarded as one or the other. When the impression is inordinate, so as to become injurious to the organs, the article used may be said to be poisonous. The *dose*, *peculiarities* of constitution, and *pathological conditions*, influence the effects. Inordinate medication is poisonous medication.

As there is some relation between food and medicines, so is there between food and poisons. Instances cited where food has acted poisonously.

The study of medicines involves attention to a number of circumstances, which may be divided into such as pertain to them as *simple bodies*, such as are important in a pharmaceutical point of view, and such as belong to them as therapeutic means.

Crude medicinal articles are obtained, by commerce, in the form of *drugs*, and, as such, must be studied with respect to their *sources* or *localities of production*, their *natural history*, the *modes of collecting and preparing them* for the market, and their *sensible properties*.

As objects of Pharmacy, their *chemical composition* and *relations* must be investigated.

With reference to Therapeutics, their *modes of operating*, *doses*, *appropriate application*, and *toxicological* effects must be inquired into.

Importance of knowing the localities from which drugs are derived.

The study of Botany and Natural History recommended.

Medicines are the tools of the profession; a knowledge of their sensible properties shown to be of absolute necessity.

A familiarity, of a practical character, with medicines cannot be dispensed with without entailing embarrassment and difficulty. In this connection, the subject of adulteration alluded to, and means of detecting it, pointed out in general.

The distinction between *indigenous* and *exotic* productions, and definitions.

That mode of growth, including soil, climate, and tillage is a powerful modifier of the properties of vegetables exhibited by examples; and the modes of collection and preparation shown to affect their virtues. This subject is connected with vegetable physiology.

The importance of *Chemistry* exhibited in determining the composition of articles and separating their *Principles*. These are divided into *Organic* or *Proximate*, as distinguished from *Elementary*. Illustrations.—Chemistry is essential to the operations of pharmacy, and in compounding medicines. It also affords the antidotes to poisons. But it is further important, in determining the changes which medicines undergo in the economy, and the alterations which are made in the solids and fluids, as therapeutics is connected with such modifications.

Some recommendations given as to the course of reading to be pursued, and the books best calculated to aid the student. A *Pharmacopœia* defined; its objects, importance, and advantages stated. The propriety of adhering to the national authority, the *United States Pharmacopœia*, insisted upon. *Nomenclature*, and its importance explained.

EFFECTS OF MEDICINES.

These cannot be determined except by observation and experiment, although various methods of determining them *à priori* have been devised. Speculation upon the effects of medicines has answered no good purpose; and we are forced to have recourse to experiment. When their effects have been determined, classification is admissible. Allusions made to natural history and other relations.

Medicines act by modifying the *solids* or *fluids:* upon the former by *augmenting* or *diminishing* their vital movements, and upon the latter by *increasing* or *lessening* their *quantity,* or *altering* their qualities. In these ways alone, the functions of organs, as well as the interior vital operations, termed organic, which are involved in assimilation or nutrition, are impressed and modified. It is not meant, however, that they are directed to one or the other exclusively. Both are intimately connected in disease.

Effects are exhibited by *phenomena*, which are apparent sooner or later. Some of them are rapid, while others are tardy in their appearance. Proof of this presented.

The effects are divided into *primary* and *secondary.*

The first are also called *physiological*, because they equally occur in health.

The secondary effects are induced through the primary; they are remote, and through them disease is removed or relieved; they are dependent on pathological as well as physiological laws; and, as they afford the therapeutical plan of action, are called sometimes the *therapeutical effects.*

The explanation of the effects, and of the mode of their production, so far as possible, is known as the *modus operandi.*

Illustrations of the primary and secondary effects given, derived from those of a purgative, a diuretic, or a sudorific, and an explanation given of what is meant by an *indication*, and the means of fulfilling it.

The primary and secondary effects are not always distinct: the primary becomes, in some cases, the therapeutical, as in the

case of alterative medicines; or, in other cases, the primary and secondary are equally therapeutical, as in the case of opium and narcotics. Explanation given, derived from the use of opium in dysentery. Other examples.

Experiments upon animals, upon man, and clinical experience commented upon; and the necessity of distinguishing between the phenomena induced by medicines, and those belonging to disease, adverted to.

The question discussed, Are medicines specific in their curative action? and the idea of specific curative action shown to be inimical to the advance of true science.

A clear distinction is to be made between the reason *why* an article produces particular effects, and the *mode* in which they are produced. The one is beyond our scrutiny, and the other is a legitimate subject of investigation.

The *primary effects* of medicines take place in three ways—1. *Locally.* 2. *By means of nervous communication.* 3. *By entering the circulation.*

1. The *local action* of medicines explained and illustrated by examples.

2. The action of medicines through the *medium* of *nervous communication* is connected with the subject of the *sympathies.* An analysis of the sympathies, and of their connection with disease, presented. The doctrine of reflex action, and its connection with the effects of medicines, explained. The fact exhibited, that in some cases the sympathetic connection between organs may be brought into operation by the direct action of medicines upon the nervous system; but that, in other instances, the same sympathies are only affected when articles are taken into the circulation. A compound mode of operation, by the circulation and the nerves jointly, shown to be most common.

3. The proof that substances *enter the circulation* is derived from direct experiments on animals; from the detection of them in the blood, in the tissues of the organs, and in the secretions. But it is further exhibited by the contamination which the blood and secretions undergo, so as to be capable, when taken into the system of other living beings, of repro-

ducing the effects of the substances with which contaminated;—by the identity of effects, when thrown into the circulation, with those in other ways produced;—and by the influence which the state of the circulation exerts upon absorption. Illustrations of these modes of proof.

Absorption takes place through the veins, as is shown by the experiments of Magendie, Segalas, Pannizza, Tiedemann and Gmelin, and Mr. Brodie, but at the same time may be effected by the lacteals and lymphatics. The experiments detailed by which these conclusions have been arrived at.

The vessels mentioned have no patulous orifices or commencement; they are spread through a reticulated structure; and we are compelled to have recourse to the physical power of *imbibition* in the vessels to explain the fact of absorption. This has been termed by Dutrochet *endosmose*, and has been defined by Matteucci to be the "mutual action of two liquids on each other when separated by membrane," there being a greater affinity on the part of a dense fluid for a lighter one. The reverse of this is called *exosmose*. Explanation of the physical phenomena given, and the laws of their production. The agency of the blood and fluid in the vessels exhibited; and the necessity of all substances being in a state of *solution* before they can enter the bloodvessels presented. An examination made of the cases of insoluble substances which are decidedly active; and the possibility of their being made soluble demonstrated. Chemistry of the utmost importance in this inquiry.

OF THE DIFFERENCE IN THE EFFECTS OF MEDICINES.

Medicines have a decided *preference* for organs, which has been termed *medical affinity;* but they vary in the manner of impressing particular organs. This preference shown by reference to emetics, purgatives, diuretics, &c., and the variation of impression illustrated by some of the particular articles belonging to the classes mentioned.

Medicines are not limited to a single uniform mode of action on one organ, but may act differently on several; thus, for example, digitalis lowers the heart's action, but stimulates the

kidneys; and other instances may be brought forward in evidence.

Another fact worthy of comment is that, by peculiar administration, and the assistance of collateral circumstances, a medicine, which ordinarily produces one set of effects, may be made to produce one entirely different. Thus, the dilution of a solution of a saline substance will determine whether it acts on the bowels or kidneys; hence the same substances are included in the classes both of Purgatives and Diuretics.

The especial mode of operating pertaining to a medicine is induced in whatever manner it is brought to bear upon the organs for which it has an affinity. It seeks out, as it were, those which are peculiarly susceptible to its impression; thus, whether taken by the stomach, by the bowels or skin, &c., the same peculiar tendency is exhibited.

Medicines are regarded as acting *locally* or *generally*, and hence the division into *local medicines*, and *general medicines*. The propriety of this distinction is more apparent than real, for, although it may be borne out in the primary manifestations of the effects of medicines, yet in the secondary there is a resemblance; and it can hardly be said that any one which is termed a local remedy, as an emetic or a sinapism, is not general. For conventional purposes the division is useful.

A point which has occupied the thoughts of therapeutists is, Are medicines necessarily *stimulant* or *sedative?* There is no doubt that a set of medicines exist, which, as a primary or secondary result, exalt the vital actions; and another set which depress them. These effects, nevertheless, may be regarded as relative, as there are states of the system when stimulation would augment debility, and sedation contribute to the increase of strength. Stimulants sometimes produce sedation, and the reverse may take place. These propositions illustrated by examples.

Some medicines are neither stimulating nor sedative in their immediate impression, and yet in the end may be either. Illustration from Tonics and Alteratives.

The effects of medicines are either *physical*, *chemical*, or *vital*. The latter are sometimes termed dynamical. They are not confined to these, however, and most frequently present a mixed

character, as physico-vital and chemico-vital. Illustrations of these several effects.

INFLUENCES which modify the effects of medicines.

DISEASE.

CLIMATE.

MODES OF LIVING.

HABIT.

TEMPERAMENT AND IDIOSYNCRASIES.

SEX.

AGE. Doses proportioned to age. Dr. Young's rule.

TIME OF ADMINISTRATION.

MENTAL EMOTIONS.

PARTS TO WHICH MEDICINES ARE APPLIED.

I. *Stomach.*—This organ is most commonly used for the administration of medicines, owing to the relation which it bears to other portions of the economy, and the facility with which it can be employed. Remarks on this mode of administration.

II. *Rectum and Bowels.*—These organs are used with several indications—

1. With the view of impressing the system; as a substitute for the stomach, as in the case of medicines disagreeing with that organ, or where the system is inordinately or disagreeably impressed by a medicine when given by the stomach; and where it is difficult or impossible to get a patient to swallow medicines.

2. When we want an additional mode of medication to promote a rapid impression.

3. To act upon the rectum and bowels specifically. Cases stated where it is important and requisite to accomplish each of these purposes.

When *fluids* are used by the rectum and bowels, they are called *enemata*, *clysters*, *lavements*, and *injections*. They may be either simple or medicated.

The quantity used varies according to the intention. When the design is to impress the system, there must be retention, and the injection used should therefore be small in quantity and un-

irritating. Mucilage in some form is usually employed as the vehicle, and the bulk of it varies, with the age, from f℥j to f℥j. The dose of the medicine to be employed is usually stated to be three times greater than that by the stomach. This rule of augmentation is not to be absolutely followed, as there are exceptions; and even with respect to some medicines the reverse may be necessary. Orfila's statement with respect to opium and tobacco.

If the design be to act upon the bowels, large quantities are to be used, but the amount proportioned to the age. For an adult a pint is usually directed, but larger quantities are sometimes required. An infant requires an ounce or more; a child of five years, three or four. Advantages and disadvantages of employment. Mode of forming injections, and the instruments employed for their administration.

Solids introduced into the rectum are called *suppositories*. Substances used, and the intention. Gases are sometimes used. The modes of using them.

III. *Urethra and Bladder.*—These organs are simply used for the local impression to be made upon them.

IV. *Vagina.*—This is used both to make a local impression and impress the system. The treatment of the diseases of females presents numerous cases in which medication is directed to this organ.

V. *Nostrils* and *Bucco-Guttural Mucous Membrane.*

VI. *Lungs.*—Substances are introduced into the lungs to make a local impression in the case of disease located in them, or to act on the system generally. They must be in the form of impalpable powder, or in that of vapor. Method of treatment based on the local impression, and the diseases to which it is applicable, stated.

To produce an impression upon the system, the substances inhaled must be absorbed. Instances of such impression given. The great relative absorbing power of the lungs exhibited, and the reasons given why the introduction of vapors by these organs is more rapid and their effects more profound.

Inhaling apparatus, and methods of using them.

VII. *Skin.*—The skin is constantly used as a portion of the body to which medication is directed. There are several modes by which this method can be carried out: 1st. By *simple application.* 2d. By *friction.* 3d. To the *surface denuded of cuticle.* 4th. By *inoculation.* 5th. By *subcutaneous injection.*

The *first*, or simple application, is called the *Epidermic Method.* All the applications made to the skin in the form of *cataplasms* or *poultices, fomentations, baths, lotions, plasters, blisters,* &c., come under this denomination.

One indication with which applications are used is to relax, soften, and induce a perspirable condition of the skin. The active agents are *heat* and *moisture.* The best substances to secure these effects indicated, and the advantages and disadvantages of the several poultices pointed out. Cases stated of the advantage derived from their use.

Another indication is to relieve pain; hence sedative applications of the same kind are highly useful. The use of poultices by the surgeon explained. The nature of fomentation, and the modes of practising it, presented.

The use of baths, the advantages and disadvantages of their employment. The kind of baths, which, when partial, are called *semicupium,* or *hip bath,* and *pediluvium,* or *foot bath.* The *temperature* of baths. *Vapor baths.* The mode of giving them, and danger from incautious use.

A third indication for applications to the skin is to refrigerate. The use of cold water, and of cold lotions explained.

They are further used to strengthen the system, as in the case of astringent baths, or locally to give force and tone. Remarks illustrative of these effects. Or to impress a part by decided medication, as by alteratives, which may act upon the part, or moderately on the system.

Finally, they are used to *stimulate.* Advantages of such stimulation shown.

The *second* species of application, or that by friction, is called the *Iatraleptic Method.* This is founded in a measure upon the absorption of substances by the skin. Proofs of such absorption. This method is used to act locally or to impress the system. Parts pointed out where absorption can take place with

most facility. Articles employed and the indications fulfilled. Examples of local and general impression. This method is also used for mere local stimulation or revulsion.

The *third* method of acting through the medium of the skin is termed the *Endermic Method.* The skin is deprived of the cuticle, as by its removal a greater power of absorption is communicated. This mode of medication is much employed in the treatment of diseases. The substances best fitted for this mode of employment are such as are very active, such as operate in small dose, and such as are soluble and not corrosive.

The skin is prepared by the application of a blister. Advantages of the blister, and the method of applying and dressing it. Caution required in applying articles to the blistered surface.

Other modes of removing the cuticle, and their disadvantages.

The design of employing the endermic method is to save the stomach, to assist medication of the stomach, and to act locally with more force than by simple inunction. Revulsion is conjoined in this way with medication. Examples given of these several indications. The amount of the medicine used is double or treble that by the mouth. Caution as regards an inordinate quantity.

Remarks upon *inoculation* with medicinal substances.

Explanation of *subcutaneous injection.*

PHARMACY.

As Medicines are brought to us in the crude state, it becomes necessary to adapt them to the purposes of exhibition; to give to them such forms as suit the different organs to which they are to be applied. To accomplish this, the operations of pharmacy are called into requisition. Pharmacy may be defined to be the *art of preparing medicines for use.*

The necessity of this art being thoroughly understood by physicians insisted on.

As exactness is essential to the operations of pharmacy, *weights* and *measures* should be understood. Remarks on weights and measures. *Avoirdupois Weight. Troy Weight.* Modification of the latter, called *Apothecaries' Weight.* Divisions of it.

The necessity exemplified of adhering to this as the uniform standard in preparing and compounding medicines.

Apothecaries' or Wine Measure; divisions; instruments; graduated measures, &c.

Drops.—Causes of variation.

MEDICINAL FORMS.

For the proper administration of medicines, certain forms are communicated to them which appertain to the subject of *preparations.* These are either *liquid, solid, semi-liquid,* or *semi-solid.*

The fluid preparations vary according to the menstruum or fluid which may be employed.

A common menstruum is water. Alcohol, ether, wine, and vinegar are also employed.

The *liquid preparations* are decoctions, infusions, solutions, medicated waters, mixtures, syrups, honeys, oxymels, vinegars, tinctures, wines, spirits, ethers, and oils.

The *solid preparations* are powders, pills, confections, extracts, troches, ointments, cerates, plasters.

The *semi-fluid preparations* are fluid extracts.

The *semi-solid preparations* are liniments.

DECOCTA, U.S.—*Decoctions* are made by boiling in water for a longer or shorter time the substances from which they are to be prepared. This mode is generally regarded as a powerful one of extracting the virtues of medicinal articles. In some cases objectionable. The grounds of objections specified. Necessity of filtration and preservation from the air. Liability to change.

INFUSA, U.S.— *Infusions* are made with water, cold or hot, without ebullition. May be made by maceration or digestion. Facilitated by the displacement process. Cold infusions best adapted to substances containing volatile ingredients. Examples cited. Pure water required; reasons for this. Preparation of substances for the preparation of infusions.

Displacement.—Filtration.

LIQUORES, U.S.—*Solutions* are preparations in which substances are simply dissolved in water. Examples.

AQUÆ, U.S.; *Medicated Waters.*—These contain a volatile oil, or gaseous matter.

MISTURÆ, U.S.—*Mixtures* are preparations which contain medicinal articles in suspension and not necessarily in solution. The articles should of themselves be miscible, or capable of becoming so by the intervention of others. Kind of articles adapted to this form stated. Mixtures may be either *simple* or *compound;* well adapted for extemporaneous prescriptions. Modes of exhibition.

MUCILAGINES, U.S.—Solutions of gummy matter made from various substances.

SYRUPI, U.S.—*Syrups* are sugary solutions of the active principles of medicines. The menstruum used may be water, or water with alcohol added, or vinegar. Strength of syrups; inconvenience of their being too strong or too weak.

Clarification.—Causes of fermentation.

MELLITA, U.S.—These are preparations made with honey. *Oxymels* are placed under this denomination by the *U. S. Pharm.*

ACETA, U.S.—Vinegars are made with diluted acetic acid or vinegar, which is a convenient solvent for some principles. Reasons for its advantageous employment. Kinds of acetic acid used.

TINCTURÆ, U.S.—*Tinctures* are alcoholic solutions of active principles. Advantages of alcohol as a menstruum. *Alcohol*, U.S., is employed for some tinctures, while *Alcohol dilutum*, U.S., is more convenient for others. Reasons for this. Mode of preparing tinctures.

Alcoolatures.

VINA, U.S.—*Wines* are solutions in wine. The wines used.

SPIRITUS, U.S.—*Spirits* are alcoholic solutions of volatile principles, and are prepared either by distillation, or by maceration, or simple solution of the principles.

ÆTHEREA, U.S.; *Ethers.*—This kind of preparation requires the action of acid or analogous principles on alcohol.

OLEA DESTILLATA, U.S.—The *Distilled Oils* are prepared by distillation. *Fixed Oils* by expression. Examples.

OLEORESINÆ, U.S.—These preparations contain both volatile oil and resin, and are made with ether or alcohol as the menstruum. They differ in the composition from fluid extracts.

PULVERES, U.S.; *Powders.*—Most dry substances can be reduced to the powdered state, which renders them convenient for manipulation. Modes of powdering. Levigation, elutriation.

Some substances lose their virtues in the powdered state; hence the necessity of careful preservation. Objection on account of the more easy adulteration.

Modes of administering powders. Simple and compound powders.

PILULÆ, U.S.; *Pills.*—One of the most popular forms of administering medicines. Advantages; mode of making pills, and nature of the articles used as excipients. Care should be taken that these are not chemically incompatible; they are sometimes selected to promote the operation. Kind of articles

to be made into pills. Size and weight of pills.—BOLUS, a large pill.

CONFECTIONES, U. S.; *Confections.*—In these the medicinal substance is beaten up and mixed with sugar or syrup. *Conserves* and *electuaries*, *linctus*. Uses.

EXTRACTA, U. S.—*Extracts* are of two kinds, *solid* and *fluid*. The latter are termed in contradistinction *Extracta Fluida*, U. S. Modes of preparing them; menstrua; caution in their preparation; composition; uses.

RESINÆ, U. S.—Resin extracts obtained by alcohol.

TROCHISCI, U. S.; *Troches.*—These are sweet gummy pellets, which dissolve slowly in the mouth. They are also called lozenges, *simple* or *medicated;* uses.

UNGUENTA, U. S.—*Ointments* are soft, viscid, fatty substances, intended for external application.

CERATA, U. S.—*Cerates* differ from ointments in being more consistent; they essentially contain wax.

EMPLASTRA, U. S.—*Plasters* are solid preparations, which are spread by heat, and which are adhesive at the temperature of the body. Substances from which plasters are prepared. Uses, mechanical support, local impression, and slow action on the system. Mode of spreading plasters.

LINIMENTA, U. S.—*Liniments* are of a fluid or semifluid consistence, intended for external application, and frequently applied by friction. They are used either to soothe the parts to which they are applied, or to stimulate. Uses and application of liniments.

CLASSIFICATION.

Remarks on classification in general, and an exposition of the advantages to be derived from it. The several systems stated and commented upon. Their suitableness for the purposes to which they are applied pointed out. Preference given to a *physiological classification*. Its fitness to aid instruction exhibited; at the same time that it does not prevent the exposition of the natural history and chemical affinities among articles of the materia medica.

With slight modification, the arrangement proposed by Dr. Wood will be adhered to. (See Table.)

TABULAR VIEW OF CLASSIFICATION.

I. Substances which act on the Solids and Fluids of the Body.

General Remedies.

- **Stimulants**
  - Permanent
    - Astringents.
    - Tonics.
  - Diffusible
    - Arterial,
    - Cerebro-nervous
      - Nervous,
      - Cerebral,
      - Excito-motor.
- **Sedatives**
  - Arterial,
  - Nervous.
- **Alteratives.**

Local Remedies.

- **Affecting functions.**
  - Emetics,
  - Cathartics,
  - Diuretics,
  - Diaphoretics,
  - Expectorants,
  - Emmenagogues,
  - Sialagogues,
  - Errhines.
- **Affecting organization.**
  - Epispastics,
  - Rubefacients,
  - Escharotics.
- **Operating mechanically.**
  - Demulcents,
  - Emollients,
  - Diluents.

II. Substances which act on Foreign Matter in the Body

Antacids.
Anthelmintics.

ASTRINGENTS.

ASTRINGENTS are substances which, when applied to the tissues of the living body, cause them to contract, and, as a consequence, increase their firmness and density.

They produce their effects *partly* through the medium of the organic contractility. This property is capable of being called into activity by appropriate stimuli, and among them astringents are very potent. This mode of operation is vital or *dynamical.*

Difference pointed out between organic contractility and muscular.

Another mode by which astringents produce their effects is *chemically.* This, however, is different from the action of chemicals on dead animal matter, because it is under the control of vitality. Coagulation takes place only to a limited extent, and can be removed by the vital action. If a complete destruction of life in a part were to follow their application, it would be superficial cauterization, and the coagulum, instead of being absorbed, would be thrown off. A ground of difference is here presented between cathæretics and astringents.

The absorption of a coagulum, produced from the protein elements of the tissues and of the blood, is accomplished by the chemical agents in the humors of the body.

The exact impression made by many substances which come under the denomination of astringents, will depend on the amount used, and on the state of the part to which applied. Instances given.

The dynamical effect of astringents has been supposed to depend upon the chemical impression; this, however, in all cases, is very difficult to be determined, and the belief may be entertained that it is distinct.

The coagulum of the elementary principles of the tissues may depend upon several affinities. These specified. There is a difference in the solubility of the coagulum which modifies the effects; and some coagulating substances appear to contain within them the requisites of subsequent solution.

Astringents are not confined to a local impression; they may act dynamically, and even chemically, upon the whole system, by their introduction into the circulation. Evidence of their introduction into the circulation; derived from action on remote organs; from their appearance in the urine, &c.; and from alteration in the characteristics of the blood.

The evidences of the action of this class of bodies are appreciable by the senses; as obvious shrinking and contraction occur, with diminution of secretion. The lips, tongue, and fauces manifest this condition, as well as ulcerated surfaces. The same impression is made upon the interior organs.

They may be said to be directed especially to the actions and functions of organic life, and but indirectly to those of animal life. Resemblance and points of difference between them and tonics. Illustrations derived from some articles of the two classes.

The action of astringents is modified by the part to which applied, by its condition, and the amount employed, as well as by the character of the article.

Astringents are employed *first*, in diseases connected with unhealthy discharges, whether secretory or hemorrhagic. Diseases specified. They should be employed in accordance with certain therapeutic rules, or they may be used injuriously. The stage of disease and sympathetic disturbance of the system must direct their employment. Excitement and fever forbid their use. Illustration by examples.

Other cases of disease where they are improper, and danger from using them.

They are employed, *secondly*, in affections depending on relaxation of tissue. This may be general or partial. If general, it is connected with constitutional disease. Affections in which it occurs specified. Where it is local, it is the result usually of inflammation or injuries. The periods of inflammation when

astringents are indicated, are either the commencement or termination of it. Explanation of their advantages at these periods. For the most part, the topical use of them is not attended with the objections which hold with regard to their internal use.

Reason why the internal use with the view to an impression upon remote parts may be defeated.

The *third* object for which astringents are used is to correct putrefaction. Examples of their use with this design.

Astringents are of two kinds, *Vegetable* and *Mineral*. The first owe their properties to a peculiar proximate principle, *tannin;* while the second, having no principle in common, are endowed with powers which belong exclusively to each one of them.

VEGETABLE ASTRINGENTS.

ACIDUM TANNICUM, *U. S.*

Tannic Acid.

Tannin.—The proximate principle of the vegetable astringents. Obtained most conveniently from powdered galls. Mode of obtaining it. Form; sensible properties; solubility. Chemical characteristics. Two kinds; one striking a *blue-black* precipitate with the salts of iron; the other a *green-black*. Source of each.

Incompatibles.

The compounds formed by the union with bases called *Tannates*. Character of the precipitate formed by each kind on animal matter. Tests.

Advantages of employing this principle. Dose, grs. ij to grs. v.

Unguentum Acidi Tannici, U. S.—Mode of preparation. Uses and advantages.

Acidum Gallicum, U. S.; *Gallic Acid.*—Mode of formation; form; appearance; sensible properties. Difference between it and tannin. Uses and dose.

GALLA, *U. S.*

Nut Galls.

Morbid excrescences upon the *Quercus infectoria*, produced by the puncture of an insect, the *Cynips quercûsfolii*. Descrip-

tion of the tree. Place of growth, Syria and Asia Minor. Mode in which the gall is formed. Two kinds, *Blue* and *White;* characters of each; sensible properties; why called Aleppo galls. Chemical composition.—Tannin exists in them in large quantity.

Character as an astringent. Uses in medicine. Antidotal powers.

Administration.—In *powder*, dose, grs. x to xx. *Infusion* made in the proportion of ʒj to boiling water Oj. Dose, fʒss to fʒij.

TINCTURA GALLÆ, U. S.—Made with galls, ʒij to Oj alcohol. Used as a test. Uses as a gargle.

UNGUENTUM GALLÆ, U. S.; *Ointment of Galls.*—Prepared by mixing finely powdered galls ʒj with lard ʒvij. Uses; objection, and substitution of the *aqueous* extract. Articles with which it may be combined.

Syrup of Galls.—Preparation. Uses.

QUERCUS ALBA, *U. S.*

White Oak Bark.

QUERCUS TINCTORIA, *U. S.*

Black Oak Bark.

The barks of *Quercus alba* and *Quercus tinctoria* alone are officinal, but others are used. Remarks on the genus Quercus. Description of the officinal species.

Characters of the bark and sensible properties. Relation to water.

Mode of preparation for use.

Black oak bark called *quercitron.*

Prominent principle *tannin.*

Medical Application.—Most commonly used for local application. Modes of employment.

The coarse powder used for poultices.

Dose in powder, grs. xx to xxx.

DECOCTUM QUERCUS ALBÆ, U. S.; *Decoction of White Oak Bark.*—Made in the proportion of white oak bark ʒj to water Oj. Mode of preparing. Dose, fʒj to ij.

An extract has been prepared. Dose, grs. x to xx.

Incompatibles.

The fruit (acorn) has been used. It contains starch, bitter principle, and tannin. Prepared by roasting; changes produced by this operation. Used in scrofula.

CATECHU, *U. S.*

Catechu.

The extract of the wood of the *Acacia catechu,* a tree of some size, a native of British India and other provinces of the East. Supposed at one time to be an earth, and called *Terra japonica.*

Mode of preparation.

Forms which it presents in the market, and the varieties; sensible qualities; purity; solubility.

Another kind from the *Uncaria Gambir.* Mode of preparation. Form. Characters and sensible properties.

Contains tannin, and a principle called *catechuic acid.*

Incompatibles.

Medical Application.—Diseases in which serviceable. For internal administration the dose is grs. x to xx of the powder.

INFUSUM CATECHU COMPOSITUM, U. S.; *Compound Infusion of Catechu.*—Mode of preparing. Dose, f℥ss to j.

TINCTURA CATECHU, U. S.; *Tincture of Catechu.*—Mode of preparing. Dose, f℥j to ij. Advantages over *Tincture of Kino.*

Troches of Catechu.

KINO, *U. S.*

Kino.

The inspissated juice of a tree, which is called *Pterocarpus marsupium,* and derived also from other plants.

There are four varieties, African, Jamaica, Botany Bay, and East Indian.

1. *African,* derived from the *Pterocarpus erinaceus.* Locality. Tree. Rare.

2. *Jamaica,* derived from *Coccaloba uvifera.* Description of plant. Mode of obtaining the substance. Mode in which it is brought into the market. Characters.

3. *Botany Bay,* derived from the *Eucalyptus resinifera.* Plant. Rare article.

4. *East Indian.* The commonest kind. Derived from *Pterocarpus marsupium.* Mode of procuring it. Source, the Malabar coast of India. It comes from Bombay.

Characters; sensible qualities; odor; taste. Powder. Solubility in water and alcohol. Appearance of the solutions.

Contains tannin, kinoic acid, and extractive.

Incompatibles.

Medical Application.—A mild astringent, used internally and externally. Uses.

Dose in substance, grs. x to xx.

Infusion or Solution used. Made in the proportion of ʒij to water fʒvj. Dose, fʒss.

TINCTURA KINO, U.S.; *Tincture of Kino.*—Mode of preparing it. Precautions; and necessity of recent preparation. Uses. Dose, fʒj to ij. Used in combination.

KRAMERIA, *U.S.*

Rhatany.

The root of the *Krameria triandra,* a native of the west coast of South America. Description of plant. The West India species, *Krameria ixina.*

Characters of the root; sensible qualities; smell; taste. Part which is active. Color of powder.

Imparts its virtues to water and alcohol.

Contains tannin.

Medical Application.—An excellent astringent, used in cases of diarrhœa, chronic dysentery, and hemorrhages. Also in other affections.

The dose in powder, grs. x to xx.

INFUSUM KRAMERIÆ, U.S.; *Infusion of Rhatany.*—Mode of preparation by macerating, Dose, fʒj to ij. Better made by displacement.

EXTRACTUM KRAMERIÆ, U.S.; *Extract of Rhatany.*—Made by displacement with cold water. The advantages of this mode, and remarks on the samples met with. Given in pills or powder. Dose, grs. x to xx.

TINCTURA KRAMERIÆ, U. S.; *Tincture of Rhatany.*—Mode of making it; an elegant preparation. Dose, f℥j to ij.

SYRUPUS KRAMERIÆ; *Syrup of Rhatany.*—Made from the extract. Mode of preparation. Dose, f℥j to f℥ss.

HÆMATOXYLON, *U. S.*

Logwood.

The inner or heart wood of the *Hæmatoxylon campechianum.* Description of the tree. Native of West Indies. Characters of the wood; appearance; density; color; effects of exposure; odor; and taste. Appearance of the coarse powder.

It contains tannin, and a red coloring principle, *hæmatin.*

Relation to water and alcohol.

Incompatibles.

Medical Application.—Belongs to the mild astringents. Used in light cases of bowel complaint, and adapted to children.

Given in *infusion* made with ℥j to Oj hot water.

DECOCTUM HÆMATOXYLI, U. S.; *Decoction of Logwood.*—Mode of preparation. Dose f℥j to f℥ij.

EXTRACTUM HÆMATOXYLI, U. S.; *Extract of Logwood.*—Mode of preparing. Remarks. Dose, grs. x to xx.

GERANIUM, *U. S.*

Cranesbill.

The rhizoma of the *Geranium maculatum.* Description of plant. Indigenous. Localities.

Characters of root; sensible properties; odor; taste. When gathered. Relations to water and alcohol.

Contains tannin and gallic acid.

Medical Application.—To what uses adapted. Powder used. Dose, grs. x to xx.

Infusion.—Mode of preparing. Dose, f℥j to ij.

Decoction.—Objections. Used in milk.

Extract.

Tincture.

RUBUS, *U. S.*

Blackberry Root.

The root of *Rubus Canadensis and Rubus Villosus.* Description of these plants. Localities. Characters and sensible properties of the roots. Contain tannin.

They yield their properties to water.

Used in powder prepared from the cortical portion. Dose, grs. x to xx, or in Infusion or Decoction. Mode of preparing these, and dose.

Medical qualities of the fruit.

SYRUPUS RUBI, U. S.; *Syrup of Blackberry Root.*

TORMENTILLA, *U. S.*

Tormentil.

The root of *Potentilla tormentilla*, a small plant, a native of Europe, sometimes called *septfoil.* Description of the plant. Characters of the root and sensible properties. Contains tannin.

Relations to water.

Uses. Dose in powder, ℈j to ʒss.

Infusion.

Decoction.

UVA URSI, *U. S.*

Uva Ursi.

The leaves of the *Arctostaphylos Uva Ursi. Bearberry.* A native of this country, and Northern Europe and Asia.

Description of the plant.

Time when the leaves are gathered.

Characters; sensible properties. Adulteration.

Powder. Relations to water and alcohol.

Contain tannin, bitter extractive, and resinous matter.

Medical Application.—Astringent and tonic, having a direction to the kidneys. Cases in which used. Given in powder. Dose, ℈j, three or four times daily. Infusion by displacement.

DECOCTUM UVÆ URSI; *Decoction of Uva Ursi.*—Mode of preparation. Dose, fʒij.

EXTRACTUM UVÆ URSI FLUIDUM, U. S.—Mode of preparation. Advantages. Dose, f℥j.

CHIMAPHILA, *U. S.*

Pipsissewa.

The leaves of *Chimaphila umbellata*, *Wintergreen*, a small plant; synonym, *Pyrola umbellata*. Description of the plant.

Leaves used; characters; form; surface; odor; taste. Distinguished from those of *Chimaphila maculata*. Mode in which it is brought into the market.

Contains tannin, extractive, &c. Relation to water.

Medical Application.—Astringent, tonic, and acting on the urinary organs. Particulars in which it differs from Uva Ursi. Especial cases to which adapted. Mode of exhibition. Infusion by displacement—mode of preparing.

DECOCTUM CHIMAPHILÆ, U. S.; *Decoction of Pipsissewa.*—Mode of preparation. Dose, f℥ij to iv, two or three times daily.

An extract and syrup have been proposed.

Made sometimes into Beer.

ROSA GALLICA, *U. S.*

Red Rose.

The petals of *Rosa gallica*.

The plant is a native of Europe, but introduced. The buds are used for medicinal purposes. Time when gathered.

Characters and sensible properties.

Contain tannin and volatile oil.

Medical Application.—A mild astringent. Used in infusion. Mode of preparation.

INFUSUM ROSÆ COMPOSITUM, U. S.; *Compound Infusion of Roses.*—Mode of preparation. A refrigerant as well as astringent. Cases to which applicable. Other uses as a vehicle. Dose, f℥j—ij.

CONFECTIO ROSÆ, U. S.; *Confection of Roses.*—Mode of formation. Uses, to form pills, and as a vehicle.

MEL ROSÆ, U. S.—Mode of preparing. Employment.

SYRUPUS ROSÆ GALLICÆ; *Syrup of Red Rose.*—Uses.

ROSA CENTIFOLIA, *U. S.*

Pale Rose.

The petals of the *Rosa centifolia;* an introduced plant.

Characters and sensible properties.

Valuable on account of the volatile oil.

AQUA ROSÆ, U. S.; *Rose Water.*—Uses.

UNGUENTUM AQUÆ ROSÆ; *Ointment of Rose Water.—Cold Cream.* Mode of preparation. Uses.

GRANATI FRUCTUS CORTEX, *U. S.*

Pomegranate Rind.

GRANATI RADICIS CORTEX, *U. S.*

Bark of Pomegranate Root.

The rind of the fruit, and bark of the root of *Punica granatum.* A small tree growing in hot climates. Localities.

Origin of name.

Characters and sensible properties of the rind. Relation to water. Contains tannin in abundance.

Characters of the root. Taste.

Flowers called *Balaustines.*

Most powerful astringent. Used in infusion or decoction. Mode of preparation, and dose. Application of the flowers.

DIOSPYROS, *U. S.*

Persimmon.

The unripe fruit of the *Diospyros Virginiana.* Medical application.

POLYGONUM BISTORTA; *the Root.*—A native of Europe. Characters and sensible properties, and application.

MINERAL ASTRINGENTS.

ALUMEN, *U. S.*

Alum.

Chemical composition; hence called *Sulphate of Alumina and Potassa.* Varieties of alum. Tests.

Found native, or manufactured. Manner of formation from alum ore. Rationale.

Form of the salt. Sensible properties. Taste.

Solubility in water. Effects of heat upon it.

Incompatibles.

Medical Application.—Astringent and coagulator of albuminous elements. Action as an astringent.

Action on the stomach in small and large doses.

Uses in hemorrhages, &c., chronic inflammations, &c.

As an emetic. Other applications.

Dose in powder, grs. v to xv. Mode of employment. Used in solution as a gargle. *Alum curd, Cataplasma aluminis.*

ALUMEN EXSICCATUM, U. S.; *Dried Alum.*—Mode of preparation. Employment.

Alum Whey.

ALUMINÆ ET AMMONIÆ SULPHAS, U. S.; *Sulphate of Alumina and Ammonia; Ammonia Alum.*—Difference between it and alum. Uses.

PLUMBUM.

Lead.

Known to the alchemists as *Saturnus.*

Found native in several forms. The sulphuret termed *Galena.*

Pure lead is said to be innoxious. Uses.

Action of air and water upon it.

The preparations of lead act therapeutically, and also poisonously.

In small doses astringent, and sedative effects are produced by them. When long continued, a wasting effect is perceived. *Tabes Saturnina.*

The poisonous effects attributable to irritation, and to a peculiar specific impression. Lead colic.

Mode in which these are produced.

Evidences of a general lead impression upon the system. Effects of this impression. Disturbance of the nervous system. Effect upon the blood.

Proof of introduction into the vessels. Mode of this introduction.

Preparations which are most active. All capable of acting on the system.

Treatment of the irritative and general effects.

Antidotes.

Preparations of Lead.

PLUMBI OXIDUM, *U. S.*

Oxide of Lead.

Semivitrified Oxide of Lead; Litharge.—Mode of preparation; form; appearance; sensible properties; insolubility; attraction for carbonic acid; test.

Composition. Impurities.

Not used internally, but employed to form the

EMPLASTRUM PLUMBI, U. S.; *Lead Plaster.*—Mode of formation. Rationale.

Characteristics of lead plaster. Used in surgery. It constitutes the basis of other plasters.

EMPLASTRUM RESINÆ, U. S.; *Resin Plaster, Adhesive Plaster.*—Mode of formation. Uses.

EMPLASTRUM SAPONIS, U. S.; *Soap Plaster.*—Mode of preparation, and uses.

GLYCERINA, U. S.; *Glycerina.*—Properties. Employment.

PLUMBI CARBONAS, *U. S.*

Carbonate of Lead.

White Lead; Ceruse.—Method of preparation.

Properties; form; color; taste; solubility in water. Chemical composition.

Not used internally, but it is the most common cause of lead disease. Used cautiously as an external remedy. It is drying and astringent as a local application. Used in the form of powder or

UNGUENTUM PLUMBI CARBONATIS, U. S.; *Ointment of Carbonate of Lead.*—Mode of preparation. Uses.

A plaster is made from it.

PLUMBI ACETAS, *U. S.*

Acetate of Lead.

Saccharum Saturni.—Sugar of lead.

Mode of preparation, from oxides, carbonates, or the metal.

Occurs in crystals. Characters; taste; solubility. Facility with which it is converted into carbonate. Change in solution. Composition.

Incompatibles.

Medical Properties.—In small doses astringent and sedative. Uses in hemorrhages, in dysentery. Local sedative effects. Combinations. Effects of long employment. Necessity for suspending the administration when a certain quantity is given. Effects in large, and in excessive doses.

Antidotes. Dose, gr. $\frac{1}{2}$ to iij, in pill. How to prepare the pill.

Use as a topical remedy. Objection in heated or highly inflamed surfaces. Effect on albumen.

LIQUOR PLUMBI ACETATIS; *Lead Water.*—Made in the proportion of ℥j to ij, to Oj of pure water.

LIQUOR PLUMBI SUBACETATIS, *U. S.*

Solution of Subacetate of Lead.

Solution of diacetate. *Goulard's Extract.*

Mode of preparation. Composition.

Characters; taste. Solution yields crystals on evaporation; proneness to undergo changes.

Incompatibles same as for acetate.

Uses as an astringent and sedative.

Necessity for dilution and formation of the

LIQUOR PLUMBI SUBACETATIS DILUTUS, U.S.; *Diluted Solution of the Subacetate of Lead.*—Strength. Cases in which useful.

CERATUM PLUMBI SUBACETATIS, U. S.; *Cerate of Subacetate of Lead.*—Mode of preparation. Uses as a dressing.

It enters into the formation of the

CERATUM SAPONIS, U. S.; *Soap Cerate.*—Mode of preparation, and uses.

PLUMBI IODIDUM, *U. S.*

Iodide of Lead.

Formed by double decomposition between acetate of lead and iodide of potassium. Rationale.

Characters. Yellow powder. Solubility.

Combination with iodides; with potassa.

Capable of producing the effects of lead.

Uses, as a resolvent. Dose, grs. iij—v.

PLUMBI NITRAS, *U. S.*

Nitrate of Lead.

Formed by the action of nitric acid upon the oxide. Rationale.

Characters. Solubility.

Poisonous effects.

In solution constitutes *Ledoyen's Disinfecting Fluid.* Uses. Mode of action.

CUPRUM.

Copper.

Metallic copper inert, but becomes active by combination. Readily combines with acids, and its activity in the stomach depends upon the presence of acid in the organ. Variation of effect from this cause.

In a healthy state of the system, no appreciable effects at first follow the exhibition of the preparations of this metal. In disease they are used with the view to an astringent, tonic, and in some cases, an alterative action. To be rendered apparent upon the organs or system, it is necessary that the exhibition should be continued for some time.

In large doses, the preparations of copper affect the stomach, and excessive quantities produce violent poisonous effects, with inflammation of the mucous membrane of the stomach. Symptoms of poisoning. Treatment.

Modes of inducing the poisonous action.

Chronic poisoning from absorption. Symptoms.

Introduction into the circulation, and influence over the blood.

CUPRI SULPHAS, *U. S.*

Sulphate of Copper.

Native sources of the salt. Prepared by the manufacturer. Mode of preparation. Rationale. Called in common language *Blue Vitriol.*

Properties. Form of crystals; appearance; taste; effect of exposure; effect of heat; solubility in water. Composition.

Incompatibles. Action of ammonia.

Medical Properties.—In small doses, astringent, tonic, and antispasmodic. Uses. Dose, gr. ¼—½—j, three or four times daily, in pills.

In larger doses, emetic. Uses.

Used as a local astringent, and escharotic in chronic inflammations, mucous discharges, and exuberant growths.

Poisonous effects.

CUPRI SUBACETAS, U. S.; *Subacetate of Copper.*—Properties and tests. Uses.

CUPRUM AMMONIATUM, *U. S.*

Ammoniated Copper.

Cupri ammonio-sulphas of the English colleges. *Ammonio-sulphate of Copper.*

Mode of preparation. Rationale.

Properties. Color of powder; effect of exposure; odor; taste. Solubility.

Incompatibles.

Medical Properties. Employment. Dose, gr. ½—3; made into pills.

ZINCUM, *U. S.*

Zinc.

Obtained in several native forms.

Remarks on the analogy between the preparations of this metal and those of copper.

ZINCI OXIDUM, *U. S.*

Oxide of Zinc.

Flowers of Zinc.—How formed, as a sublimate; by precipitation.

Color of powder; destitute of odor and taste; non-solubility in water. Solubility in acids and alkalies; in albumen. Composition.

Medical Properties.—Feebly irritant. In small doses tonic. Locally applied, astringent, and desiccant. Uses.

UNGUENTUM ZINCI OXIDI, U. S.; *Ointment of Oxide of Zinc.*—Mode of preparation, and uses.

TUTIA; *Impure Oxide of Zinc; Tutty.*—Mode of preparation. Characters. Uses.

ZINCI SULPHAS, *U. S.*

Sulphate of Zinc.

White Vitriol.—Mode of preparation. Rationale. An impure salt is made by roasting the sulphuret.

Form of crystals; color; taste. Solubility. Effect of exposure and heat. Composition.

Incompatibles.

Effects of ammonia.

Medical Properties.—Astringent; tonic; emetic. Application.

Tendency to act on the nervous system. Dose, gr. ½—2, in pill.

Local employment. Strength of solution.

Resemblance to Epsom salts and poisonous impression.

ZINCI ACETAS, *U. S.*

Acetate of Zinc.

Mode of preparation. Rationale.

Character of crystals; taste; effect of exposure; action of heat.

Medical Properties.—Astringent; in large doses, irritant. Much used as a topical remedy. Seldom used internally.

As an astringent wash or injection, grs. ij—x to f℥j water.

ZINCI CARBONAS PRÆCIPITATA, *U. S.*

Precipitated Carbonate of Zinc.

Mode of preparation by double decomposition. Rationale.

Reason for introducing this preparation.

Color and appearance of the powder. Used to form

CERATUM ZINCI CARBONATIS, U. S.; *Cerate of Carbonate of Zinc.*—Preparation. Uses the same as of calamine cerate.

CALAMINA.

Calamine.

Native impure Carbonate of Zinc.—Obtained from England.

The native calamine is in the form of lumps of a pink color.

From this is prepared

CALAMINA PRÆPARATA; *Prepared Calamine.*—Mode of preparation.

Form; color; appearance. Change induced by heat in the native carbonate.

Liability to adulteration.

Used as a mild desiccative, and astringent agent; either in the form of dry powder, or

CERATUM CALAMINÆ; *Calamine Cerate*, known as *Turner's Cerate.* Uses.

CADMIUM, *U. S.*

CADMII SULPHAS.

Sulphate of Cadmium.

Mode of obtaining it.

In the form of crystals; appearance; taste; solubility. Effects of exposure.

Composition.

Action on the economy. Resemblance to the sulphate of zinc. Topical employment.

TONICS.

THESE medicines, when properly administered, produce a gentle and persistent exaltation of the vital movements, and thereby give strength and vigor to the animal system.

The animal system is composed of solid elements in the tissues and organs, and of fluid elements which compose the blood. The latter are distributed to the organs, contributing to their formation. Besides the supply of blood, there must exist in the organs a power of appropriating its constituents; in this resides *nutrition.* Secretion and the production of heat are associated with nutrition. The power resident in the tissues of carrying on their vital operations, of maintaining their nutrition, has been termed tonicity, orgasm, and vital erection. Bichat separated it into two properties—organic sensibility, and organic contractility. These are connected with innervation.

Tonics influence the nutrition, and are, therefore, directed to the movements of organic life; but, as animal life is under the control of organic life, tonics have an influence over this also.

Muscular power has been confounded with tonicity of the whole body. It is one of the evidences of a tonic state, yet it is deceptive, as it may be exhibited, under excitement, where the tone of the system generally is feeble. Strength and health depend upon full nutrition of all the organs, and due excitement in them.

Tonics differ from astringents in affecting all the vital properties, instead of being restricted to contractility, and in increasing the nutritive qualities of the blood, as well as promoting its coagulability.

They differ from stimulants in the amount of excitement in-

duced, and additionally in producing power, while stimulants alone occasion increased action.

They are called *roborants*, *corroborants*, and *strengtheners;* but under all circumstances are not entitled to these appellations. Explanation of the circumstances under which they fail to increase strength. They are to be regarded as relative agents. And they are not to be regarded as strictly permanent.

The first impression is made upon the stomach, next upon the general system. Evidences of these two modes of operation.

Proofs of the introduction into the circulation.

The connection between bitterness and tonic properties discussed.

Tonics are used in cases of debility; this occurs where the vital forces are below the natural standard—where the functions are performed sluggishly—a condition dependent on imperfect nutrition. Mode of correcting this condition. It is met with in convalescence from acute disease; in nervous affections, &c.

Influence of impaired nutrition on the nervous centres. The irregular symptoms which are manifested. Necessity of not mistaking simulative for real disease in the different organs. Explanations and cases.

Effects in low forms of disease. In chronic diseases.

Deleterious impression, general, and local.

Division into *Pure Bitters*, *Peculiar Bitters*, *Stimulating Tonics*, *Aromatic Tonics*, and *Mineral Tonics*.

PURE BITTERS.

In this division are placed such articles as induce a roborant impression upon the stomach, increasing the appetite, and invigorating digestion, without any action upon the circulation, except from their prolonged employment. They possess tonic properties solely, and do not influence other organs except through the function of digestion. One of them may always be substituted for another. In large doses they nauseate, and may act upon the bowels.

QUASSIA, *U.S.*

Quassia.

The wood of the *Simaruba excelsa*, formerly *Quassia excelsa.* This tree has been likewise called *Picræna excelsa.*

Description of the Tree.—A native of Jamaica, called *Bitter wood.*

Quassia amara.—Description of this plant. The first from which quassia wood was obtained. A native of Surinam and the West Indies.

Properties of the wood. Form in which it comes; the appearance of the bark; size of billets; color of wood; texture; appearance of section; taste. Powder.

Adulteration.

Form in which kept in shops.

Active principle *Quassin.* Characters of the principal reagents. Relation to water and alcohol.

History of the discovery of this wood.

Medical Properties.—Pure tonic and stomachic, in large doses oppressing the stomach. Reputed influence on the nervous system. Uses.

INFUSUM QUASSIÆ, U.S.; *Infusion of Quassia.*—Strength. Dose, f℥j to ij. Mode of preparing extemporaneously.

TINCTURA QUASSIÆ, U.S.; *Tincture of Quassia.*—Preparation. Dose, f℥j to ij.

Advantages of using it.

EXTRACTUM QUASSIÆ, U.S.; *Extract of Quassia.*—Mode of preparation. Characters. Dose, grs. ij to v. Use as a vehicle.

SIMARUBA, *U.S.*

Simaruba.

The bark of the *Simaruba officinalis.*

Description of the tree. An inhabitant of Jamaica and the West India Islands, called *Bitter Damson.*

Bark of branches and root employed in medicine.

Properties. Form; appearance; taste.

Contains *Quassin.* Its relation to water and alcohol.

Medical properties similar to those of quassia. Uses.

Dose of powder, grs. x. Objection.

Given in *infusion*. Mode of preparing. Dose f℥j to ij. *Tincture.*

COPTIS, *U. S.*

Gold Thread.

The root of *Coptis trifolia.*

Description of plant. An inhabitant of the United States.

Characteristics of root. Form; color; odor; taste.

Constituent, bitter extractive. Relations to water and alcohol.

Employment as a mild tonic, &c. Used in *infusion* and *tincture.*

GENTIANA, *U. S.*

Gentian.

The root of the *Gentiana lutea. Yellow Gentian.*

This is a beautiful plant of Europe, found in Alpine situations.

Description of plant.

Properties of the root. Size and shape of the pieces; external appearance and color; internal structure and color; odor, and taste. Powder.

Contains *gentianin* and other ingredients. Characters of gentianin.

Effect of maceration and fermentation.

Medical Properties.—A powerful bitter. Effects of long use. Employment. Remarks on the *Portland Powder.* Combinations.

Dose of gentian in powder, grs. x to xx.

INFUSUM GENTIANÆ, U. S.; *Infusion of Gentian.*—Preparation. Dose, f℥j to ij.

INFUSUM GENTIANÆ COMPOSITUM, U. S.; *Compound Infusion of Gentian.*—Constituents. Cases to which adapted. Dose, f℥j to ij.

TINCTURA GENTIANÆ COMPOSITA, U. S.; *Compound Tincture of Gentian.*—Preparation. Dose, f℥j to ij.

EXTRACTUM GENTIANÆ, U. S.; *Extract of Gentian.*—Mode of preparation. Qualities. Application and combinations. Dose, grs. v to x.

EXTRACTUM GENTIANÆ FLUIDUM, U. S.—Mode of preparation. Uses. Dose, f℥ss to f℥j.

Remarks on the *Gentianeæ*. Other species of *Gentiana* mentioned. *G. purpurea* and *G. punctata*. *American species.*

FRASERA, *U. S.*

American Columbo.

The root of the *Frasera Walteri*. Indigenous.

Description of the plant.

Properties of the root. Odor; taste.

Contains bitter extractive. Relations to *Gentianeæ*.

Uses and modes of administration.

CALUMBA, *U. S.*

Columbo.

The root of the *Cocculus palmatus*.

Description of the plant. An inhabitant of the Mozambique coast of Africa. History.

Properties of the root. Form of the pieces; color and characteristic markings; fracture; odor; taste. Powder.

Adulteration.

Constituents, a peculiar principle *Columbin*, and starch.

Reagents. Relation to water and alcohol.

Medical Properties.—In small doses, tonic and sedative to stomach. In large affects the stomach. Employment.

Dose of powder, grs. x to xx. Decoction objectionable.

INFUSUM CALUMBÆ, U. S.; *Infusion of Columbo.*—Preparation.

Dose, f℥j to ij. *Cold infusion* preferable.

TINCTURA CALUMBÆ, U. S.; *Tincture of Columbo.*—Preparation. Dose, f℥j to ij.

SABBATIA, *U. S.*

Sabbatia.

American Centaury.—The herb of *Sabbatia angularis*. Indigenous. Description of plant. Herbaceous portion used.

Properties. Uses. Mode of administration and difference of effects from the manner of giving it. Infusion.

ERYTHRÆA CENTAURIUM; *Lesser Centaury of Europe.*—Character of the herb. Uses, and mode of administration.

EUPATORIUM PERFOLIATUM, *U. S.*

Thoroughwort.

Boneset.—The herb of *Eupatorium perfoliatum.* An indigenous plant. The flowering tops and leaves employed.

Two forms found in the shops.

Properties; odor; taste; liability to mouldiness.

Contains bitter extractive.

Menstrua, to which it imparts its properties, water and alcohol.

Medical Properties. Uses; varied effects from mode of administration. Forms of administration.

INFUSUM EUPATORII, U. S.; *Infusion of Thoroughwort.*—Preparation. Dose, f℥j—ij.

Other species of *Eupatorium.*

PECULIAR BITTERS.

By this denomination are meant the bitter tonics which possess particular properties in connection with their tonic power, which render them available under circumstances calling for the exercise of these properties. Each one of them has peculiarities which are *sui generis.*

PRUNUS VIRGINIANA, *U. S.*

Wild Cherry Bark.

The bark of the *Cerasus serotina,* or *Wild Cherry.*

Description of the tree. Remarks on the anomaly presented by the name. The tree indigenous; variation in size.

The inner bark of the trunk and branches, or that of the root, is employed.

Properties of the bark; appearance; color; fracture; odor; and taste. Relations to water and alcohol.

It contains a bitter principle (extractive), tannin, and a peculiar principle *amygdalin.*

Characteristics of *amygdalin*, its reaction with emulsion, and the production of *hydrocyanic acid*, and a *volatile oil*.

Proofs of the production of the acid and oil by this reaction.

Remarks on *Pruneæ* and *Amygdaleæ*.

Medical Properties.—Tonic and sedative; effects upon the pulse. Cases to which adapted.

Powder administered in dose of grs. x to xxx.

Decoction objectionable.

INFUSUM PRUNI VIRGINIANÆ, U.S.; *Infusion of Wild Cherry Bark.*—Mode of preparation. Advantage of cold infusion. Dose, f℥ij, or more, several times daily. Sometimes a few drops of an acid added.

SYRUPUS PRUNI VIRGINIANÆ U.S.; *Syrup of Wild Cherry Bark.*—Mode of preparation. Characteristics. Uses. Dose, f℥ss.

EXTRACTUM PRUNI VIRGINIANÆ FLUIDUM, *Fluid Extract of Wild Cherry Bark.*—Mode of preparing and uses. Dose, f℥j.

CINCHONA.

Peruvian Bark.

The bark of different species of *Cinchona* from the western coast of South America.

History and introduction.

Names by which known.

Remarks on the genus *Cinchona*.

Species positively known to yield the barks of commerce, are: *Cinchona Condaminea*, *Cinchona micanthra*, *Cinchona Calisaya*, *Cinchona cordifolia*, and *Cinchona pitayensis*.

Description of these plants and their localities.

Botanical history.

Geographical position, elevation, temperature of the bark regions. Localities, *Loxa*, *St. Fe de Bogota*, *Huanuco*, *La Paz*, and *St. Martha*. Explanation of these several positions, and the source of the distinction between *Peruvian* and *Carthagena Barks*.

The Peruvian *officinal*. Carthagena *non-officinal*.

Mode of collecting and preparing the Cinchona bark.

Classification. Different plans adopted; that of the sensible properties preferred. Geiger's chemical classification.

CINCHONA PALLIDA, U. S.; *Pale Cinchona.*—Name from the appearance of the powder. Form, that of quills.

It includes *Loxa bark* and *Huanuco bark.*

1. *Loxa Bark.*—Obtained from the *Cinchona Condaminea.* Quality. Known as *Crown bark.* Form; size of quills; mode of rolling; external appearance and color; inner surface; fracture; odor; taste.

2. *Huanuco Bark.*—Called sometimes *Lima bark.* Obtained from the *Cinchona micanthra.* By the English called *Silver Gray.* Size of quills. External appearance. Internal surface; fracture; odor; and taste.

CINCHONA FLAVA, U.S.; *Yellow Cinchona, Calisaya Bark.*—Sometimes called *Royal Yellow.* Obtained from the *Cinchona Calisaya.* In two forms, quilled and flat.

1. *Quills.*—Size; external surface; internal appearance; peculiarity of the fissures and of the epidermis; structure; peculiarities of fracture; odor; taste. Parts of tree from which procured.

Powder.

2. *Flat Pieces.*—Size; form; color; structure; and fracture; relative value.

CINCHONA RUBRA, U. S.; *Red Cinchona.*—Obtained from unknown species in two forms. Quills and flat pieces.

1. *Quills.*—Size; color. Manner in which rolled. External and internal surface; fracture; odor; and taste.

2. *Flat Pieces.*—Size; external aspect and variety; internal structure and color; fracture; variation in the layers.

Powder.

Carthagena Barks.—Varieties; distinctive characteristics.

Relative value.

Mode of packing the barks.

Chemical History.

Constituents, *Quinia, Cinchonia, Quinidia, Cinchonidia, Quinoidine,* kinic acid, &c.

Advantages of possessing the alkaloids.

Quinia.—Form and color; effect of heat upon it; solubility;

taste; composition; reaction with acids. Tests. Source and mode of preparation.

Cinchonia.—Form; effect of heat upon it; solubility; taste; composition; reaction with acids; action of the atmosphere. Tests. Preparation.

Quinidia.

Cinchonidia.—Form; characteristics. Tests. Preparation and source.

QUINIÆ SULPHAS, U. S.; *Sulphate of Quinia.*—Chemical constitution, a *Di-sulphate.* Form; appearance of the crystals. Effects of exposure. Action of heat. Complete destructibility. Solubility. Appearance in solution. Taste. Chemical tests. Mode of preparation. Rationale.

Incompatibles. Adulteration, and means of detection.

Neutral Sulphate.—Mode of preparation.

CINCHONIÆ SULPHAS, U. S.—*Sulphate of Cinchonia, Di-sulphate.* Form; appearance; solubility; conversion into *neutral* sulphate.

Cinchonidiæ Sulphas.—Mode of preparation and characters.

Kinic acid.

Effects and Application of Bark and its Preparations.—Effect upon the healthy system; not innocuous. Effects upon the nervous system. Effects in small doses. Tonic and antiparoxysmal effect. Effects in over-doses. Poisonous impression of sulphate of quinia.

Employment in intermittent fever. The questions discussed—

Should bark or its preparations be given before, during, or after the paroxysm?

In what doses ought it or its preparation to be given?—and how often should they be repeated?

By what varied means is the system to be brought under the influence of the medicine?

Objections which have been urged against the use of bark.

Employment in remittent fever; in typhus and adynamic fevers; in neuralgic and other affections.

Mode of administration. Dose in powder, ʒj, repeated every hour, until ℥ss—j has been given. Mode of mixing it; vehicles used; combinations and formulæ.

INFUSUM CINCHONÆ FLAVÆ, U.S.; *Infusion of Yellow Cinchona.*—Mode of preparing. Incompatibles. Employment. Dose, f℥j to ij.

INFUSUM CINCHONÆ RUBRÆ, U. S.; *Infusion of Red Cinchona;* called, also, *Compound Infusion of Bark.*—Mode of preparation, and ingredients. Chemical state of the active principles. Dose, f℥j to ij.

DECOCTUM CINCHONÆ FLAVÆ, U. S.; *Decoction of Yellow Cinchona.*—Mode of preparation. Reason of its turbidness. Effect of over boiling; comparative strength. Dose, f℥j to ij.

DECOCTUM CINCHONÆ RUBRÆ, U. S.; *Decoction of Red Cinchona.*—Mode of preparation. Dose, f℥j to f℥ij.

TINCTURA CINCHONÆ, U. S.; *Tincture of Cinchona.*—Mode of preparation. Dose, f℥j to ij.

TINCTURA CINCHONÆ COMPOSITA, U.S.; *Compound Tincture of Cinchona*, or HUXHAM'S TINCTURE.—Mode of preparation; ingredients; uses. Dose, f℥j to ij.

Remarks on the Tinctures.

EXTRACTUM CINCHONÆ, U. S.; *Extract of Cinchona.*—Mode of preparation; properties. Dose, five to ten grains, in pill.

EXTRACTUM CINCHONÆ FLUIDUM, U. S.; *Fluid Extract of Cinchona.*—Mode of preparation; uses. Dose, f℥j.

PILULÆ QUINIÆ SULPHATIS, U. S.; *Pills of Sulphate of Quinia.*—Mode of compounding them. Each pill contains gr. j of the sulphate. Caution with respect to old pills made with gum Arabic.

Solution of Sulphate of Quinia.—Advantages. Mode of effecting solution. Proneness to produce irritation.

Combination of Sulphate of Quinia with Tannin.

Crude Quinia.

Impure Sulphate. Quinoidine.

QUINIÆ VALERIANAS, U. S.; *Valerianate of Quinia.*—Mode of preparation. Characters. Uses. Dose, gr. j–v.

Endermic method of using bark and its salts.

CORNUS FLORIDA, *U. S.*

Dogwood.

The bark of the *Cornus Florida.* Description of the tree; an inhabitant of the United States.

The bark is derived from the root, trunk, and branches.

Appearance of the bark; form; color; fracture; odor; taste. Powder.

Contains bitter extractive matter, tannin, and some resinous principle.

Medical Properties as a tonic. Employed in intermittent fever.

Objection to its use.

Dose in powder, ℈j to ʒj.

DECOCTUM CORNUS FLORIDÆ, U. S.; *Decoction of Dogwood Bark.*—Mode of preparation. Dose, fʒj to ij.

Other species of *Cornus.* Value.

LIRIODENDRON TULIPIFERA, U. S.; *American Tulip Tree.*—Decoction. Employment.

MAGNOLIA, U. S. The several species of *Magnolia.*

Remarks on the Poplars and Willows. *Salicine.*

STIMULATING TONICS.

These, in addition to tonic power, are possessed of stimulating properties, which render them available under certain circumstances. They owe their peculiarities to the union of the bitter principle with a volatile oil.

ANTHEMIS, *U. S.*

Chamomile.

The flowers of the *Anthemis nobilis.*

Description of the plant. A native of Europe, called in some countries *Roman Chamomile.*

Effect of cultivation. Structure of the flowers, and transformation.

Characters as found in the shops. Color; odor; taste. Relation to water and alcohol.

Contain bitter extractive and volatile oil.

Medical Properties.—Tonic and stomachic. Modification of action by mode of administration.

Rarely given in substance. Dose, ℈j.

INFUSUM ANTHEMIDIS, U. S.; *Infusion of Chamomile.*—Mode of preparation. Dose, f℥ij to iv.

Decoction and extract inappropriate. Reasons for this.

Other COMPOSITEÆ. *Anthemis cotula. Artemisia absinthium. Centaurea benedicta. Tanacetum vulgare.*

RUTACEÆ.—*Ruta graveolens.*

SERPENTARIA, *U. S.*

Serpentaria.

Virginia Snakeroot.—The root of the *Aristolochia serpentaria;* of *A. reticulata* and other species of *Aristolochia.*

Description of these plants. Inhabitants of the middle and southern portions of the United States.

Properties of the root; form; appearance and color; fracture; odor; taste; varieties. Powder.

Yields its virtues to water and alcohol.

Contains bitter extractive, resin, and volatile oil.

Medical Properties.—Stimulating and tonic; action on the skin and kidneys. Effects of large doses. Employment. Dose of powder, grs. x.

INFUSUM SERPENTARIÆ, U. S.; *Infusion of Virginia Snakeroot.*—Mode of preparation. Dose, f℥ss to ij.

Cold Infusion.

TINCTURA SERPENTARIÆ, U. S.; *Tincture of Virginia Snakeroot.*—Preparation. Dose, f℥j to ij. Uses.

EXTRACTUM SERPENTARIÆ FLUIDUM, U. S.; *Fluid Extract of Serpentaria.*—Mode of preparation. Uses. Dose, f℥j.

MYRRHA, *U. S.*

Myrrh.

The concrete juice of the *Balsamodendron Myrrha.* A native of Arabia, also found in Africa. Description of tree.

Properties. Size and form of pieces; color; fracture; odor; taste; varieties. Color of powder.

Constituents, gum, resin, and a little volatile oil.

Relations to water and alcohol.

Medical Properties.—Tonic and stimulating, with a direction to the lungs and uterus. Employment; combinations.

Administered in pill or powder. Dose, grs. x.

In solution with water. Myrrh mixture.

Enters into the composition of the *Compound Mixture of Iron.*

TINCTURA MYRRHÆ; *Tincture of Myrrh.*—Mode of preparation; uses. Dose, f℥j to ij. Effect of mixture with water. Remarks on the necessity of using alcohol of the *U. S. Pharm.*

Pills of *Myrrh and Iron*, and of *Aloes and Myrrh.*

ANGUSTURA, *U. S.*

Angustura.

The bark of the *Galipea officinalis*, and probably the *G. Cusparia.*

Description of plants. Inhabitants of the northern and eastern parts of South America. In the neighborhood of Angostura.

Form of the bark; character of the edges; external and internal surfaces; color; fracture; action of moisture; odor; taste. Relation to water and alcohol. Color of powder.

Contains bitter resin and volatile oil.

Medical Properties.—Tonic and stimulating.

Dose, in powder, grs. x to ℈j.

INFUSUM ANGUSTURÆ, U. S.; *Infusion of Angustura Bark.*—Mode of preparation. Dose, f℥j to ij.

False Angustura.—Source and characters; mode of distinguishing.

CASCARILLA, *U. S.*

Cascarilla.

The bark of the *Croton Eleuteria*, also from the *Croton Cascarilla* according to some authorities.

Description of plants. Natives of the West Indies.

Two forms of the bark; appearance, and distinguishing marks. Odor; taste. Relation to water and alcohol.

Constituents. Bitter principle, resin, and volatile oil.

Medical Properties.—Tonic, stimulating, grateful to the stomach. Employment in fevers; in cases of children when teething, &c.

INFUSUM CASCARILLÆ, U.S.; *Infusion of Cascarilla.*—Mode of preparation. Dose, f℥j to ij.

Tincture not officinal, but a handsome preparation.

Used as an adjuvant to bitter infusions.

AROMATIC TONICS.

These are substances having a sweet, agreeable, penetrating odor, and a warm pleasant taste. Many of them come under the head of *Spices*, which, from their power of acting decidedly upon the organs, become medicinal agents.

They owe their properties to the existence of *Volatile Oils;* true vegetable proximate principles; sometimes they are called *Distilled and also Essential Oils.*

Odor; taste; volatility; specific gravity; inflammability; and relation of these oils to water and alcohol.

Substances for which they are solvents.

Composition; and action of the atmosphere upon them.

Adulterations, and means of detection.

Arrangement into classes.

All substances containing volatile oil are powerful stomachics, aiding digestion. Necessity of them in warm climates. Called *Carminatives.* Mode of action. More stimulating than pure tonics, and more local in their action than stimulants.

AURANTII AMARI CORTEX, *U.S.*

Bitter Orange Peel.

The rind of the fruit of the *Citrus vulgaris.*

AURANTII DULCIS CORTEX, *U.S.*

Sweet Orange Peel.

The rind of the fruit of the Citrus Aurantium.

AURANTII FLORES, *U.S.*

Orange Flowers.

The flowers of *Citrus Aurantium and Citrus Vulgaris.*

They grow in warm countries.

Rind of the Bitter; appearance; odor; taste. That of the Sweet destitute of bitterness.

The first contains bitter extractive and volatile oil; the latter only volatile oil. Relation to water and alcohol.

A tonic *infusion* may be made from the bitter; but it is generally employed as an adjuvant.

CONFECTIO AURANTII CORTICIS, U. S.; *Confection of Orange Peel.*—Mode of preparation. Uses.

AQUA AURANTII FLORUM, U. S.; *Orange Flower Water.*—Made by distillation.

CINNAMOMUM, *U. S.*

Cinnamon.

The bark of the *Cinnamomum Zeylanicum and Cinnamomum aromaticum.* Description of the plants, and remarks on the family of *Laurineæ.*

The first-named species is a native of the island of Ceylon; the second of China.

Ceylon cinnamon; mode of preparing, and commercial history. Qualities.

Properties; odor; taste.

Constituents, volatile oil and tannin.

OLEUM CINNAMOMI, U. S.; *Oil of Cinnamon.*—Mode of preparation. Properties. Action of atmosphere.

China cinnamon, commonly known as *cassia.*

Properties and distinguishing characteristics.

Medical Properties.—Tonic, stimulating, and carminative. Also astringent.

Uses as an adjuvant.

Dose, in powder, grs. x to ʒss.

An infusion made in the proportion of ʒij to Oj of water.

AQUA CINNAMOMI, U. S.; *Cinnamon Water.*—Mode of preparation. Uses as a vehicle. Dose, fʒss to j.

TINCTURA CINNAMOMI, U. S.; *Tincture of Cinnamon.*—Dose, fʒss to ij. Uses.

SPIRITUS CINNAMOMI, U. S.; *Spirit of Cinnamon.*—Made of stronger alcohol. Uses.

PULVIS AROMATICUS, U. S.; *Aromatic Powder.*—Composition. Uses.

CANELLA, *U. S.*

Canella.

The bark of the *Canella alba.*

Description of the tree. A native of the West Indies.

Mode of removing the bark and separation of the epidermis.

Form of pieces; appearance and color; fracture; appearance of the surfaces; odor; taste. Powder.

Relation to water and alcohol.

Contains an acrid volatile oil, resin, and bitter extractive.

Medical Properties.—Tonic and aromatic. Employment. Advantages in combination. Given in infusion or tincture. Enters into the

PULVIS ALOES ET CANELLÆ, U. S.; *Powder of Aloes and Canella.*

WINTERA; *Winter's Bark.*—History and description of the tree called *Drymis Winteri.* An inhabitant of Patagonia.

Properties of the bark. Difference between it and Canella. Employment.

MYRISTICA, *U. S.*

Nutmeg.

The kernel of the fruit of the *Myristica moschata.* A native of the Molucca Islands, especially Amboyna and Banda.

Description of the tree and especially of the fruit.

History of the article.

Mode of preparing the nutmeg. Properties of good nutmegs; odor; taste.

Contains a fixed and a volatile oil.

OLEUM MYRISTICÆ, U. S.; *The Volatile Oil of the Kernels of the Fruit of the Myristica Moschata.*—Characteristics.

MACIS, U. S.; *Mace.*—The arillus of the fruit. Mode of preparing it for use. Properties; odor; taste. Contains a volatile oil and a fixed oil. Mode of obtaining them.

Medical Properties of the nutmeg. Uses as a stimulant and stomachic; narcotic property.

Dose, in powder, ℈j; of the oil, gtt. iij to v.

Employment of the fixed oil of mace.

CARYOPHYLLUS, *U. S.*

Cloves.

The unexpanded flowers of *Caryophyllus aromaticus*, called, by some botanists, *Eugenia caryophyllata*.

Description of tree. A myrtle. An inhabitant originally of the Molucca Islands, but has been distributed through the tropics.

Form of cloves; color; odor; taste. Relation to water and alcohol.

Contain volatile oil, extractive, resin.

OLEUM CARYOPHYLLI, U. S.; *Oil of Cloves.*—Preparation; characters.

Medical Properties.—One of the most powerful of the aromatics. Used in infusion, or as an adjuvant.

Dose, in substance, grs. v to x.

INFUSUM CARYOPHYLLI, U. S.; *Infusion of Cloves.*—Clove tea. Prepared with ℥ij to Oj of hot water. Dose, f℥j to ij. Uses.

PIMENTA, *U. S.*

Pimento.

The unripe berries of the *Eugenia pimenta*. It is called also *Allspice* in commerce. A native of Jamaica and other West India Islands.

Description of the tree.

Berries. Form; aspect; color; odor; taste. Powder.

Contain an essential oil and resin.

OLEUM PIMENTÆ, U. S.; *Essential Oil of Pimenta.*

Characters. Dose, gtt. ij to v.

Medical Properties.—A stimulating aromatic. Employment. Uses as an adjuvant.

PIPER, *U. S.*

Black Pepper.

The berries of the *Piper nigrum.* An inhabitant of Sumatra and the Islands of the Eastern Archipelago.

Description of the pepper vine.

Characters of the unripe fruit.

Contains *piperin*, and a volatile oil.

White Pepper.

Medical Properties.—Powerfully stimulating. Employment. Uses as an adjuvant. Dose in substance, grs. v to x.

Dose of piperin, grs. ij to viij, given in pill. Activity as a medicine.

OLEORESINA PIPERIS, U. S.; *Oleoresin of Black Pepper.*—Mode of preparation. Dose, f℥ss to ℥j.

CUBEBA, *U. S.*

Cubeb.

The berries of *Piper cubeba.* A native of Java and the East India Islands.

Description of plant.

Time at which the berries are plucked.

Characteristics. Form; external appearance; appendage; odor; taste. Powder. Effects of age upon them.

Contain a volatile oil, and cubebin.

Relation to alcohol and water.

Medical Properties.—Stimulating, with an especial direction to the urinary organs. Uses. Danger from improper use.

Dose of powder, ℥j. Mode of exhibition.

Pills with copaiba.

OLEUM CUBEBÆ, U. S. Dose, gtt. xx.

OLEORESINA CUBEBÆ, U. S.; *Oleoresin of Cubeb.*—Mode of preparation; advantages. Dose, gtt. xx to f℥j.

TINCTURA CUBEBÆ, U. S.; *Tincture of Cubeb.*—Dose, f℥ss—j.

TROCHISCI CUBEBÆ, U. S.; *Troches of Cubeb.*—Uses.

Remarks on the *Piperaceæ*, and allusion to other species.

CARDAMOMUM, *U. S.*

Cardamom.

The fruit of *Elettaria cardamomum.* A native of Malabar and the East Indies.

Description of the plant.

Capsules; form; color; construction; odor; taste. Appearance and form of the seeds. Powder prepared from the latter; liability to deteriorate.

Relation to water and alcohol.

Constituents, volatile oil, resin, and extractive.

Varieties of cardamom.

Medical Properties.—A warm and grateful aromatic. Employment as an adjuvant.

Dose of the powder, grs. v to x.

TINCTURA CARDAMOMI, U. S.; *Tincture of Cardamom.*—Mode of preparation. Dose, f℥j to ij.

TINCTURA CARDAMOMI COMPOSITA, U. S.; *Compound Tincture of Cardamom.*—Ingredients and mode of preparation. Dose, f℥j.

Cardamom enters into the *Confectio aromatica*, U. S., and *Pulvis aromaticus*, U. S.

ZINGIBER, *U. S.*

Ginger.

The rhizoma of *Zingiber officinale.* A native of the East and West Indies.

Description of the plant. Characters of the root.

Mode of preparing it for commerce. When dry, called *Black* and *Race* ginger. Imported from Calcutta.

Form; appearance; color; odor; taste. Powder.

White Ginger.—Source Jamaica. Manner of preparation. Properties. Powder.

Effect of worms in ginger.

Contains starch, volatile oil, resin.

Relation to water and alcohol.

Medical Properties.—Those of a grateful, aromatic stimulant and carminative. Employment. Uses as an adjuvant. External use.

Dose of powder, ℈j.

INFUSUM ZINGIBERIS, U. S.; *Infusion of Ginger.*—Made with ℥ss ginger to Oj boiling water. Dose, f℥j to ij.

TINCTURA ZINGIBERIS, U. S.; *Tincture of Ginger.*—An alcoholic solution of the oil and resin. Dose, f℥j.

SYRUPUS ZINGIBERIS, U. S.; *Syrup of Ginger.*—Made from the tincture. Used as a cordial drink, with water or mineral water.

OLEORESINA ZINGIBERIS, U. S.; *Oleoresin of Ginger.*—Mode of preparation. Dose, f℥ss.

TROCHISCI ZINGIBERIS, U. S.; *Troches of Ginger.*

CALAMUS, *U. S.*

Sweet Flag.

The rhizoma of the *Acorus calamus.* Indigenous. Also found in Europe.

Description of the plant.

Properties of the root; odor; taste.

Contains extractive and volatile oil.

Liable to be worm-eaten.

Medical Properties.—Warm, stimulant tonic. Employment.

Remarks on the UMBELLIFERÆ.

FŒNICULUM, *U. S.*

Fennel.

The fruit of the *Fœniculum vulgare*, an inhabitant of the warmer countries of Europe, and introduced into this country.

Description of the plant.

Fruit; odor; taste; contains an essential oil.

OLEUM FŒNICULI, U. S. Properties.

Medical Properties.—Aromatic, stimulating. Employment in purgative infusions, and other preparations.

Dose of the oil, gtt. ij to v.

AQUA FŒNICULI, U. S.; *Fennel Water.*—Preparation. Employment.

CARUM, *U. S.*

Caraway.

The fruit of the *Carum carui*, a plant of Europe.

Description of plant.

Fruit; odor; taste. Owes its properties to an essential oil.

OLEUM CARUI, U.S.; *Oil of Caraway.*

Employment of *caraway* as an adjuvant.

Dose of oil, gtt. ij to v.

CORIANDRUM, *U. S.*

Coriander.

The fruit of *Coriandrum sativum.* Native of Europe. Introduced.

Fruit. Contains an essential oil. Employment as an adjuvant.

ANISUM, *U. S.*

Anise.

The fruit of the *Pimpinella anisum*, a native of Europe and Africa.

Fruit; odor; taste.

Contains volatile oil. OLEUM ANISI, U.S.

Used as a flavorer.

Dose of oil, gtt. ij to v.

STAR ANISE, the seeds of the *Illicium anisatum.* A native of China.

Contains an oil so closely resembling the *oil of anise* as to be substituted for it.

SPIRITUS ANISI, U.S.; *Spirit of Anise.*

Remarks on the LABIATÆ.

LAVANDULA, *U. S.*

Lavender.

The flowers of *Lavandula vera*, a native of Europe. Introduced into this country.

Description of plant.

Flowers and tops. Odor.

OLEUM LAVANDULÆ, U.S.; *Oil of Lavender.*

SPIRITUS LAVANDULÆ, U.S.; *Spirit of Lavender.*—Preparation by distilling the flowers with alcohol. An agreeable refreshing perfume.

SPIRITUS LAVANDULÆ COMPOSITUS, U.S.; *Compound Spirit of Lavender.*—Mode of preparing. Ingredients. An elegant cordial and carminative.

Uses; as a flavorer. Dose, f3j.

ROSMARINUS, *U.S.*

Rosemary.

The tops of the *Rosmarinus officinalis.* A native of Europe, but introduced.

Description of plant.

Leaves and flowers. Odor.

Contain an oil. OLEUM ROSMARINI, U.S.

Enters into the composition of *Compound Spirit of Lavender,* and of *Linimentum Saponis,* U.S.

SALVIA, *U.S.*

Sage.

The leaves of *Salvia officinalis.*

Contains an essential oil and tannin.

Used in infusion. Internally as an aromatic astringent and tonic; and locally as a gargle or wash.

INFUSUM SALVIÆ, U.S.; *Infusion of Sage.*

Formula for a *Compound Infusion.*

MENTHA PIPERITA, *U.S.*

Peppermint.

The herb of *Mentha piperita.* A native of Europe; but common in the United States. Introduced.

Odor and taste of the plant.

Contains an oil. OLEUM MENTHÆ PIPERITÆ, U.S.; *Oil of Peppermint.* Characteristics. Dose, gtt. ij to v.

Fresh leaves used as a cataplasm.

Used with a view to its stimulating and carminative properties in the form of infusion.

SPIRITUS MENTHÆ PIPERITÆ; *Spirit of Peppermint; Essence of Peppermint.*—Mode of preparation. Strength. Dose, gtt. v—x—xv.

AQUA MENTHÆ PIPERITÆ, U.S.; *Peppermint Water.*—Mode of preparing. Uses as a vehicle, &c.

TROCHISCI MENTHÆ PIPERITÆ, U.S.; *Troches of Peppermint.*—Mode of preparing. Uses.

MENTHA VIRIDIS.

Spearmint.

The herb of *Mentha viridis.*

Characters. Employment.

OLEUM MENTHÆ VIRIDIS, U.S.; *Oil of Spearmint.* Dose, gtt. ij to v.

SPIRITUS MENTHÆ VIRIDIS; *Spirit of Spearmint; Essence of Spearmint.*—Dose, gtt. x to xx.

AQUA MENTHÆ VIRIDIS, U.S.; *Spearmint Water.*—Uses, as a carminative, &c.

MELISSA, U.S.; *Balm.*—The herb of *Melissa officinalis.*

HEDEOMA; *Pennyroyal.*—The herb of *Hedeoma pulegioides.*

GAULTHERIA, *U.S.*

Partridge Berry.

Leaves of *Gaultheria procumbens.* Native of the United States. Contains an oil. *Oleum Gaultheriæ*, U.S.

Employed to flavor preparations.

MINERAL TONICS.

These differ in power, and in adaptation to the states of the system. They are employed under the utmost diversity of circumstances. They may be divided into those pertaining to the *Metals* and the *Mineral Acids.*

FERRUM, *U. S.*

Iron.

Other names *Chalybs* and *Mars;* hence *Ferruginous*, *Chalybeate*, and *Martial* preparations.

Forms of iron in nature.

In the metallic state, inert; must undergo change to render it serviceable as a medicine.

Resemblance of action between the preparations. The soluble most energetic.

Effects of continued small doses on health. Adapted to cases of debility, more especially, where there is an impoverished state of the blood. This is attendant upon anæmia.

Causes and symptoms of anæmia. Distinction between the passive and active symptoms. Liability of the latter to be mistaken for acute disease. Remarks upon this important part of Therapeutics.

Connection between anæmia and deterioration in the constitution of the blood; change in the physical character of this fluid. Comparison between healthy and anæmic blood, and extent to which reduction of the elements takes place.

Indications to be fulfilled by the ferruginous preparations. Effects upon the organs and system generally, upon special organs.

State in which iron exists in the blood, connected with the principle, *hæmatin*. Mode of detecting it.

Proofs of absorption.

Therapeutic application of the preparations of iron. Diseases in which used; length of time that ferruginous preparations are to be continued. Caution in using them. They are numerous.

FERRI RAMENTA; *Iron Filings.*

Prepared by filing iron, and separating the finer particles by a magnet through a sieve.

Properties.

Action from meeting with an acid in the stomach; reason for uncertainty and the disengagement of *gas*. Dose, grs. v to xx.

FERRI OXIDI SQUAMÆ; *Scales of Iron.*

Mode of obtaining them. Properties; composition; action of atmosphere. Preparation for medicinal use.

Similar in action to the filings. Dose, grs. v to xx.

FERRUM REDACTUM, *U. S.*

Reduced Iron.

FERRI PULVIS; *Iron by Hydrogen.*—Mode of preparing it. Sometimes called *Quevenne's Iron.* Rationale.

Appearance of the powder. Properties. Given in pill. Dose, gr. j to v.

FERRI OXIDUM HYDRATUM, *U. S.*

Hydrated Oxide of Iron.

FERRI SESQUIOXYDUM HYDRATUM.

Mode of preparation. Rationale.

Properties; color. Form in the dried state; also in the moist. Composition.

Employed rather as an antidote to arsenic, although the medical effects are the same as those of the rust of iron or the Prepared Carbonate. When given for antidotal purposes, the quantity should be large.

Dose, grs. x to xx.

FERRI SUBCARBONAS, *U. S.*

Subcarbonate of Iron.

Precipitated Carbonate of Iron.

Mode of preparation. Rationale.

Appearance when first prepared; change in color from the action of the atmosphere. Rationale.

Taste; solubility.

Composition.

Character as a chalybeate, combined with bitter tonics and aromatics. Dose, grs. ij to v. Mode of administration, in pill, or with syrup. Changes it undergoes in the stomach.

The *Prepared Carbonate* or *Rust of Iron,* sometimes called *Rubigo ferri,* resembles the preceding. Mode of preparation. Rationale. Properties. Dose, grs. v to xx.

PILULÆ FERRI CARBONATIS, *U. S.*

Pills of Carbonate of Iron.

Mode of preparation; advantage of using syrup in the preparation.

Appearance; consistence; taste; solubility.

Advantages of its preparation.

Dose, grs. ij to x three times daily.

TROCHISCI FERRI CARBONATIS, U. S.; *Troches of Carbonate of Iron.*

PILULÆ FERRI COMPOSITÆ, *U. S.*

Compound Pills of Iron.

Composition. Uses. Dose, grs. iv to viij.

Remarks on the Carbonates and their existence in mineral springs.

FERRI SULPHAS, *U. S.*

Sulphate of Iron.

Green Vitriol.—Copperas.

Mode of preparing. Rationale.

Properties; form and color of crystals. Taste; solubility; effects of exposure to the atmosphere; effect of heat.

Composition.

Incompatibles.

Medical Properties.—Astringent and tonic. Effects in large doses. Cases to which adapted. Antidotes.

Dose in solution, gr. j to v.

Importance of using the dry sulphate in pills. Dose, gr. ½ to ij. In doses of grs. xx, acts on the stomach.

From this is prepared the MISTURA FERRI COMPOSITA, U. S. Mode of preparation; ingredients; changes, and rationale. Dose, f℥ss.

FERRI SULPHAS EXSICCATA, U. S.; *Dried Sulphate of Iron.*

Ferri et Ammoniæ Sulphas, U. S.; *Sulphate of Iron and Ammonia; Ammonio Ferric Alum.*—Preparation and characteristics. Uses.

LIQUOR FERRI SUBSULPHATIS, U. S.; *Solution of Subsulphate*

of Iron; Solution of Persulphate of Iron; Monsel's Solution.—Mode of preparation; sensible properties; composition. Uses as an astringent.

LIQUOR FERRI TERSULPHATIS, U. S.; *Solution of Tersulphate of Iron.*—Mode *of preparation*, called *Solution of Sesquisulphate.* Characters; composition. Used to make the hydrated oxide of iron and other pharmaceutical preparations.

FERRI CHLORIDUM, *U. S.*

Chloride of Iron.

Mode of preparation; characters and composition. Uses.

TINCTURA FERRI CHLORIDI, *U. S.*

Tincture of Chloride of Iron.

Sometimes called *Muriated Tincture of Iron.*

Mode of preparation. Reactions which take place, and rationale.

Properties. Color; odor; taste. Effects of exposure.

Medical Properties.—Astringent, tonic, and diuretic. Effects in over-doses. Antidotes.

Cases to which it is adapted. Dose, gtt. v—x—xx.

FERRI ET POTASSÆ TARTRAS.

Tartrate of Iron and Potassa.

Mode of preparing. Rationale.

Form; color; taste; solubility. Composition.

Character as a chalybeate mild; advantages.

Dose, grs. x to xx.

It is the base of the *Vina Ferri;* Wines of Iron.

FERRI ET AMMONIÆ TARTRAS, U. S.; *Tartrate of Iron and Ammonia.*

FERRI PHOSPHAS, *U. S.*

Phosphate of Iron.

Mode of preparation. Rationale.

Color of powder; taste. Composition. Effects of exposure. Insolubility.

Employment. Dose, grs. x to xx.

FERRI PYROPHOSPHAS, U. S.; *Pyrophosphate of Iron.*

FERRI FERRO-CYANIDUM, *U. S.*

Ferrocyanide of Iron.

Pure Prussian Blue.

Mode of preparing. Rationale.

Form; color; insolubility; composition.

Medical Properties.—Tonic and sedative. Employment in nervous affections. Dose, grs. v to xx.

SYRUPUS FERRI IODIDI, *U. S.*

Syrup of Iodide of Iron.

Formerly Liquor Ferri Iodidi. Mode of preparing. Advantages of the sugar used in the preparation.

Dose, gtt. x to xx.

Ferri Iodidum; Iodide of Iron.

Mode of preparing.

Form; color; odor; taste; solubility in water and alcohol. Attraction for moisture. Effects of exposure to the atmosphere.

Composition.

Incompatibles.

Medical Properties.—Cases to which adapted. Dose, gr. j. to ij, in pill or solution. Effects in over-doses.

LIQUOR FERRI NITRATIS, *U. S.*

Solution of Nitrate of Iron.

Mode of preparation.

Characters; odor; taste; composition.

Employment as an astringent and tonic. Dose, gtt. x to xxx.

FERRI CITRAS, *U. S.*

Citrate of Iron.

Mode of preparing. Composition and properties.

Mild tonic. Dose, grs. ij to v, in pill or solution.

LIQUOR FERRI CITRATIS, U. S.; *Solution of Citrate of Iron.*

FERRI ET QUINIÆ CITRAS, U. S.; *Citrate of Iron and Quinine.*—Application.

FERRI ET AMMONIÆ CITRAS, U.S.; *Citrate of Iron and Ammonia.*

FERRI LACTAS, *U.S.*

Lactate of Iron.

Mode of preparing; composition; characteristics; solubility. Adapted to children. Dose, gr. j to v.

Ferrum Ammoniatum; Ammoniated Iron.

Mode of preparing. Rationale. Form; color; odor; taste; solubility. Composition.

Medical Properties.—Tonic, aperient, and alterative. Employment in nervous affections. Dose, grs. iv to x. In pill or solution.

BISMUTHUM, *U.S.*

Bismuth.

The preparations of this metal used in medicine are—

BISMUTHI SUBCARBONAS, *U.S.*

Subcarbonate of Bismuth.

Mode of preparation; characters. Freedom from arsenic and other metals. Uses. Dose, gr. j to v. Employed as a substitute for the subnitrate.

BISMUTHI SUBNITRAS, *U.S.*

Subnitrate of Bismuth.

Formerly called *White Oxide*, and *Magistery of Bismuth.*

Mode of formation. Rationale.

Form; color; effect of exposure. Solubility in nitric acid.

Composition.

Medical Properties.—Astringent and tonic in small doses; in large, irritative. Employment in affections of the stomach. Effect on stools.

Dose, grs. iij to x, in pill.

Ointment of Subnitrate.

ARGENTUM, *U. S.*

Silver.

ARGENTI NITRAS.

Nitrate of Silver.

Mode of preparation. Rationale.

Character of the crystals; taste and solubility. Effect of heat upon them. Effect of exposure. Mode of keeping.

Composition.

Incompatibles. Tests.

When fused, constitutes *Argenti Nitras Fusa*, U. S.; *Lunar Caustic.*—Form and mode of preserving.

Adulterations.

Chemical relation to the organic animal principles.

Modes of entrance into the circulation. Proof of this.

Medicinal effects in small doses. Effects in large doses—in larger.

Therapeutic application. Difference in the quantity which can be administered dependent on the form. Amount which may be given in 24 hours, grs. v to vj. *Effect of discoloring the skin.* Dose, gr. ¼—i—ij, given in pill. Objection to solution. Antidotes. Used as an escharotic.

ARGENTI OXIDUM, U. S.; *Oxide of Silver.*—Mode of preparation.

Appearance and sensible qualities. Composition.

Medical Properties.—As an astringent and alterative employed in affections of the stomach and intestines.

Dose, gr. ½ to ij, in pill.

ARGENTI CYANIDUM, U. S.; *Cyanide of Silver.*—Officinal for the purpose of preparing *Hydrocyanic Acid.*

Mineral Acids.

ACIDUM SULPHURICUM, *U. S.*

Sulphuric Acid.

Oil of Vitriol of commerce. Obtained from the manufacturer.

Form; consistence; color; sp. gr. 1.845; odor; taste. Affinity for water. Source of impurity.

Incompatibles.

Effects on organic tissues in the concentrated state. Toxicological effects. Treatment.

In appropriate doses, tonic, refrigerant, and astringent. Employment in diseases. Objection to its prolonged use.

The preparations usually employed are

ACIDUM SULPHURICUM DILUTUM, U. S.; *Diluted Sulphuric Acid.*—Strength; preparation. Mode of administration. Dose, gtt. x to xx.

ACIDUM SULPHURICUM AROMATICUM, U. S.; *Aromatic Sulphuric Acid; Elixir of Vitriol.*—Ingredients; color; odor; taste. An elegant preparation. Dose, gtt. x to xx.

Local application of *Sulphuric acid. Ointment.*

ACIDUM SULPHUROSUM, U. S.; *Sulphurous Acid.*—Mode of preparation. Uses.

ACIDUM NITRICUM, *U. S.*

Nitric Acid.

Aqua Fortis.—Prepared by the manufacturer.

Distinction between the *Nitric* and *Nitrous Acids* of the shops, and explanation of what is meant by the *Acidum Nitrosum* of Edinburgh College.

Characters of *Nitric Acid.* Color; odor; taste; sp. gr. 1.42.

Incompatibles.

Effects upon the tissues of the concentrated acid. Diagnostic symptoms. Treatment.

Medical Properties.—In small doses, tonic and alterative. Ef-

fects on the organs; upon the gums; on the blood. Liability to irritate the stomach. Cases in which useful. Dose, gtt. ij to v. Mode of exhibition. "*Hope's Mixture.*"

ACIDUM NITRICUM DILUTUM, U. S.; *Diluted Nitric Acid.* Strength. Sp. gr. 1.06. Dose, gtt. x to xx.

Administration. Vessel to be used.

Topical employment. Amount of dilution.

Ointment. Uses.

Employment as a disinfectant.

ACIDUM MURIATICUM, *U. S.*

Muriatic Acid.

Hydrochloric Acid. Chlorohydric. Marine Acid.—Manufactured by the chemist.

Consistence; color; odor; taste; sp. gr. 1.16. Causes of impurity.

Incompatibles.

Medical Properties.—Tonic and stimulating. Employment in low forms of disease. Local application. Dose, gtt. v—x, in water or a bitter infusion.

ACIDUM MURIATICUM DILUTUM, U. S.; *Diluted Muriatic Acid.* Strength. Sp. gr. 1.03. Dose, gtt. x—xx.

ACIDUM NITRO-MURIATICUM, *U. S.*

Nitro-Muriatic Acid.

Mode of preparation. Rationale of reaction which occurs, called *Aqua Regia.*

Characteristics; odor; taste; corrosive properties; power of dissolving gold.

Medical Properties.—Tonic and alterative. Effect upon the liver; upon the skin. Diseases in which used with advantage. Dose, gtt. v—x. Mode of administration.

External use by foot-bath; hip-bath or sponging; strength of solution, f℥j to ij to gallon of water.

ACIDUM NITRO-MURIATICUM DILUTUM, U. S.; *Diluted Nitro-Muriatic Acid.* Strength. Dose, gtt. x—xxx.

CHLORINIUM, *Chlorine.*—Used internally in the form of *Aqua Chlorinii*, U. S. Employment in the form of gas in diseases of the pulmonary apparatus. Employment as a disinfectant. Mode of acting as a disinfectant.

OLEUM MORRHUÆ, *U. S.*

Cod-Liver Oil.

A fixed oil obtained from the liver of the *Gadus Morrhua.* Mode in which obtained. Varieties of the oil; causes of these varieties. Properties of these kinds; consistence; odor; taste. Test of the pure oil. Adulterations.

Contains the fatty principles; also iodine and bromine.

Medical Properties.—Effects upon the nutrition; upon the general functions; control over chronic diseases. Remarks on the mode of operating. Cases to which applicable. Liability to disorder the stomach. Dose, f℥ss to j two or three times daily. Mode of administration, and necessity of perseverance.

ARTERIAL STIMULANTS.

THIS class of medicines has also been termed Excitants, and Diffusible Stimulants. The term Arterial stimulants acquired from the more immediate and decided impression upon the heart and circulation. But these effects not confined to the bloodvessel system, as the nervous system is also impressed, and through it the various other organs.

The primary impression is upon the stomach, or tissue with which they are brought into immediate contact; this is communicated to the bloodvessels, and maintained by absorption.

They differ from tonics in acting rapidly and forcibly; in adding nothing to the blood; producing action merely, and not power. Their impression is consequently evanescent, and is followed by depression.

Most of the articles employed as stimulants have a tendency to act upon particular organs, which might authorize an arrangement under other classes. Those only are placed in this class which, from their general action, become useful in the management of diseases.

They are employed in cases of debility, with great depression of the vital powers, and where there is prostration and tendency to collapse. They are, however, not to be indiscriminately employed in consequence of the danger of inordinate reaction; where, therefore, there is a tendency to inflammation, they should be cautiously given. Cases illustrative of this.

They are used in hemorrhages; in debility during the progress or at the termination of acute disease; also to establish reaction at the onset of disease. The contra-indication always is the existence or proneness to inflammatory action.

Symptoms which evince their injurious impression.

The existence of inflammation not always to be regarded as an obstacle to their administration, as it may even, under certain circumstances, be benefited by them. Cases illustrative of this.

AMMONIÆ CARBONAS, *U.S.*

Carbonate of Ammonia.

This salt is sometimes called *Sesquicarbonate of Ammonia.*

Mode of formation. Rationale.

When first obtained, sesquicarbonate; but by rectification, becomes a carbonate.

Form, fracture, color, and transparency of the mass; odor and taste; the effect of exposure and conversion into bicarbonate. Solubility; action of acids upon it.

Medical Properties.—In small doses, stimulant and calefacient; acting upon the general system, but local also in its impression; and prone, in too great a quantity, to irritate the stomach. The stimulating impression evanescent, and requiring renewal.

In large quantity, a powerful irritant, inducing inflammation.

The prolonged use productive of dissolution of the blood, or a liquefacient effect upon it, inducing cachexy.

Cases in which it may be beneficially employed; tendency to act upon the skin and lungs as well as on the nervous system; cases in which this is serviceable.

Employment as an antacid; also in poisoned wounds, and as an antidote. Advantageously combined.

Administration in pill or solution. Disadvantages of the pill; preferable in the later form. Dose, grs. v to x. Mode of preparing carbonate of ammonia mixture.

SPIRITUS AMMONIÆ AROMATICUS, U.S.; *Aromatic Spirit of Ammonia.*—Ingredients. Mode of preparation.

Employment. Dose, f℥ss to ij, freely diluted in sweetened water.

SPIRITUS AMMONIÆ, U.S.; *Spirit of Ammonia.*—Mode of preparation. Employment, the same.

OLEUM TEREBINTHINÆ, *U. S.*

Oil of Turpentine.

Spirit of Turpentine. Source and preparation.

Consistence; color; odor; taste; sp. gr.; volatility; inflammability. Solubility in water, alcohol, and ether.

Chemical composition, and effects of exposure.

Medical Properties.—General stimulating effects, with determination to lungs, and especially the kidneys. In large doses, it operates on the bowels. Detection in urine.

Inordinate impression. Action locally on skin.

Employment as a stimulant. Stages of fever and inflammation where it is serviceable; in hemorrhages.

Advantages of combination.

Dose, gtt. x to xx. Mode of administration.

By the rectum. Mode of preparing the *Oil of Turpentine Enema.* Uses as a revulsive.

CAPSICUM, *U. S.*

Capsicum.

Cayenne Pepper. The fruit of *Capsicum annuum* and other species. Inhabitants of hot climates; cultivated in this country.

Description of the plant.

Fruit; form; color; odor; taste; varieties.

Preparation of the powder, color, and effect of time upon it.

Contains *Capsicin*, extractive, and a pungent oil.

Relation to water and alcohol.

Medical Properties.—Both locally and generally stimulating, and applied to the skin acts as a rubefacient. Used to arouse the stomach, and to produce an alternative action in parts which are attacked with a low grade of inflammation.

Dose, grs. v to x, given in pill.

INFUSUM CAPSICI, U. S.; *Infusion of Capsicum.*—Strength of the infusion. Dose, f℥ss. When used as a gargle, generally made stronger.

TINCTURA CAPSICI, U. S.; *Tincture of Capsicum.*—An alcoholic solution. Dose, f℥j to ij.

External employment.

OLEORESINA CAPSICI, U. S.; *Oleoresin of Capsicum.*—Mode of preparation. Uses. Dose, gtt. ij—v.

ALCOHOL, *U. S.*

Alcohol.

Spirit of Wine.—Origin of the term alcohol.

Mode of production by *vinous fermentation* from grape sugar. Rationale. Other sources.

Division of spirituous liquors into fermented and distilled.

FERMENTED. Wines, cider, malt liquors, &c.

DISTILLED. Brandy, whiskey, rum, gin, arrack, &c.

Source of flavor.

Mode of obtaining alcohol. *Proof Spirit. Absolute Alcohol.*

Properties of officinal alcohol. Color; odor; taste; volatility and inflammability; sp. gr. .835.

Substances for which alcohol is the best solvent. Pharmaceutical employment.

ALCOHOL FORTIUS, U. S.; *Stronger Alcohol.*—Sp. gr .817. Uses.

ALCOHOL DILUTUM, U. S.; *Diluted Alcohol.*—Strength; sp. gr. .941. Application.

Medical Properties.—External use as a refrigerant, and as a stimulant. Combinations.

Internal employment as a stimulant. Effects on the circulation and nervous system. Poisonous impression. Effects of prolonged use. Proofs of absorption.

In disease, a most valuable aid to our therapeutic means, and may be employed in cases attended with sinking and prostration; with great success in low forms of fever, and in analogous stages of other affections.

SPIRITUS VINI GALLICI, U. S.; *Brandy.*

SPIRITUS FRUMENTI, U. S.; *Whiskey.*

Brandy is usually given in toddy or milk punch; but other liquors may be substituted.

Varieties of Wine.—VINUM XERICUM, U. S.; *Sherry Wine.* VINUM PORTENSE, U. S.; *Port Wine; Red Wine.*—Relative

strength, and advantages of one wine over another in certain cases. Given in the form of *Wine whey.* *Spiced Wines.*

Malt liquors; their peculiarities.

PHOSPHORUS, *U. S.*

Source from which obtained.

Characters; effect of light and heat. Mode of keeping it. Solubility in ether and oils.

A powerful stimulant; action quick, but not durable. Acting on secretions and on the genital organs. In too great a quantity, corrosively poisonous. Treatment. Little used on account of the violence of its operation; but at one time employed.

Given in ethereal solution, made into an emulsion. Dose. gr. $\frac{1}{16}$, $\frac{1}{12}$, $\frac{1}{8}$.

Used with oil as a rubefacient and cauterant.

ACIDUM PHOSPHORICUM GLACIALE, U. S.; *Glacial Phosphoric Acid.*

ACIDUM PHOSPHORICUM DILUTUM, U. S.; *Diluted Phosphoric Acid.*—Mode of preparation. Characters. Sp. gr. 1.036.

NERVOUS STIMULANTS.

THESE may be defined to be substances capable of exerting a decided stimulating impression upon the nervous system and its central organs, the brain, spinal marrow, and the ganglia.

The circulatory system, however, is secondarily influenced by them. The union between the nervous and circulatory systems is so close, that it is difficult to understand that an impression can be made upon one without involving the other. Yet in pathological conditions the preponderance of nervous impression is most marked.

The term *Antispasmodics* has been employed to designate this class. Objection to the term, founded both on the peculiar conditions not spasmodic, which articles belonging to this class are capable of removing, and on the diversity of measures employed to allay spasm.

Nervous stimulants are most efficacious in pure nervous derangement without organic lesion. In studying their effects, we must first investigate the peculiarities of nervous action; and it will be found that, in individuals prone to derangements of this kind, there exists excessive *mobility* of the nervous system. Explanation of what is meant by this term. Symptoms of perverted nervous action. Origin of what are called "Vapors" and "Spasms" in the nervous centres; and their manifestation by reflex action explained. Views of the older pathologists on this subject.

Illustrations from affections belonging to the class called *nervous*, and especially hysteria. Connection between these affections and debility. Power of increasing and equally diffusing nervous power possessed by nervous stimulants. Modus operandi predicated upon this.

Employment in affections having nervous complications, the only contra-indication being high excitement; but where excitement is simulative, most efficacious.

Idea entertained of the connection between antispasmodics and odoriferous properties.

Proof of their absorption, in addition to an impression by nervous agency.

MOSCHUS, *U. S.*

Musk.

A peculiar concrete substance, derived from the *Moschus moschiferus*. The animal is a native of northern China and Tartary, and is also found in the Himalaya Mountains.

Character and habits of the animal.

Musk Pod.—Where situated. Form; covering; size; structure; amount of musk contained.

Musk.—Consistence; color; feel; odor; taste; varieties.

Adulteration. Means of determining genuineness.

Relation to water, alcohol, and ether.

Constituents. Necessity of preservation in dry vessels.

Medical Properties.—Stimulates the nervous system, but with little effect upon the circulation. In large doses, affects the head. Impregnation of the secretions. Diseases in which used with advantage. Given in pill or emulsion. Dose, grs. j to v.

TINCTURA MOSCHI; *Tincture of Musk.*—Not officinal. Dose, gtt. xxx.

CASTOREUM, *U. S.*

Castor.

A peculiar concrete substance, obtained from the *Castor fiber*, or *Beaver*. Peculiar to the northern portions of Europe, Asia, and America.

Position of the pods; shape and appearance; structure; color; consistence; odor and taste of castor.

Two varieties, American and Russian. Difference between them.

Constituents. Volatile fatty matter, resinous matter, *Castorin*.

Medical Properties.—Decidedly a nervous stimulant. Employment in spasmodic and nervous affections. Dose, grs. x to xx in pill.

TINCTURA CASTOREI, U.S.; *Tincture of Castor.*—Dose, gtt. xxx.

VALERIANA, *U.S.*

Valerian.

The root of the *Valeriana officinalis.* A native of Europe. Cultivated in England and introduced into the gardens of this country.

Time of collecting the root. Modifications from soil. Care in drying it.

Properties; form and appearance; color; odor; taste.

Powder.

Constituents, volatile oil, resin, and an acid, *Valerianic.*

OLEUM VALERIANÆ, U.S.—Mode of preparing.

ACIDUM VALERIANICUM, *Valerianic Acid,* prepared from *Valerianate of Soda,* U.S.—Mode of preparing this salt. Properties of valerianic acid, and uses in forming valerianates.

Medical Properties.—One of the most valuable of the class. A decided stimulant. Effect on the head in large doses. In small doses, also tonic.

Employment. Dose of powder, ℈j to ʒss, repeated.

INFUSUM VALERIANÆ, U.S.; *Infusion of Valerian.*—Dose, ℥ss to ij.

TINCTURA VALERIANÆ, U.S.; *Tincture of Valerian.*—Advantages. Dose, fʒj.

TINCTURA VALERIANÆ AMMONIATA, U.S.; *Ammoniated Tincture of Valerian.*—Made with *Aromatic Spirit of Ammonia.* Antacid and stimulating. Dose, fʒss, properly diluted.

EXTRACTUM VALERIANÆ ALCOHOLICUM, U.S.; *Alcoholic Extract of Valerian.*—Mode of preparing. Dose, gr. ij—v. Useful for combining in pills.

EXTRACTUM VALERIANÆ FLUIDUM, U.S.; *Fluid Extract of Valerian.*—Mode of preparing. The most valuable preparation. Dose, gtt. x to xxx.

Remarks on valerianates. VALERIANATE OF AMMONIA, U.S.; *Valerianate of Ammonia.*—Mode of preparation. Properties. Uses. *Valerianate of Zinc, Valerianate of Quinia.*

ASSAFŒTIDA, *U.S.*

Assafetida.

The concrete juice of the root of the *Narthex Assafœtida*, a native of Persia.

Description of the plant. One of the *Umbelliferæ.*

Mode of collecting the juice from the root. Consistence when fresh.

Characters; in *tears;* form; color externally and internally; in *masses;* consistence; appearance; fractured surface; change from exposure to the atmosphere; odor; taste. Powder.

Constituents, gum, resin, and oil.

Relation to water and alcohol.

Adulterations.

Medical Properties.—A strong stimulant to both the nervous and sanguiferous systems. Effect on stomach, lungs, and bowels.

Proofs of absorption.

Employment in nervous disorders; in pulmonary affections; in stomachic diseases.

Adapted to cases of children and old persons.

Dose, grs. v to x, in pill.

MISTURA ASSAFŒTIDÆ, U.S.; *Assafetida Mixture. Lac Assafœtidæ.* Dose, f℥ss.

TINCTURA ASSAFŒTIDÆ, U.S.; *Tincture of Assafetida.*—Change when mixed with water. Dose, gtt. xx to lx.

Combinations.—*Pills of Assafetida and Aloes*, &c.

SUCCINUM.

Amber.

Source whence procured; locality.

Form; color; translucency; effect of heat.

By destructive distillation there are obtained from it an oil, and an acid, *Succinic.*

OLEUM SUCCINI, U. S.; *Oil of Amber.*—Mode of preparation. When redistilled, it constitutes the

OLEUM SUCCINI RECTIFICATUM, U. S.; *Rectified Oil of Amber.*

Appearance when first obtained. Color of the purified; consistence; odor; taste. Effect of age.

Medical Properties.—A decided stimulant, and in over-doses affecting the head. Also acts on kidneys.

Employment. Dose, gtt. v to xx, in emulsion.

External application.

DRACONTIUM, *U. S.*

Skunk Cabbage.

The root of the *Dracontium fœtidum;* also called *Ictodes fœtidus*, and *Symplocarpus fœtidus.* A native of this country.

Form of the dried root. Color; fracture; odor; taste. An acrid principle resides in it, which is dissipated by heat and removed by decoction.

Medical Properties.—Stimulating, antispasmodic, and narcotic. Effects in large doses. It derives its reputation from its use in asthma. Dose in powder, grs. x to xx.

THEA; *Tea.*—The leaves of *Thea Bohea* and *T. viridis.* It contains a peculiar principle called *Thein.*

COFFEA, U. S.; *Coffee.*—The seeds of the *Coffea arabica.* They contain *caffein.*

Remarks on the use of TEA *and* COFFEE.

CEREBRAL STIMULANTS.

THESE are substances which, with a general impression upon the nervous system, have a more special direction to the brain, which they decidedly affect. Although the primary effect is stimulating, it is soon followed by depression and subsidence of the vital actions, so as to give rise to the idea that they are sedatives. Sleep is the most prominent effect induced by them; hence they have been termed *Narcotics*, *Soporifics*, *Hypnotics*, and *Stupefacients;* and, as they relieve pain, they have also been called *Anodynes*.

From their action, three stages are observable: 1st. That of stimulation. 2d. That of narcotism or sleep. 3d. That of depression. These stages depend, for intensity and duration, upon the quantity administered. Illustrations of this.

All the organic and animal movements and functions evince the power of their impression. In the first instance, both series are invigorated; in the second, the organic are depressed and the animal suspended; and in the last, there is depression of all.

In employing narcotics, it is important to understand the cause of prostration, and not confound it with that induced by disease.

The difference in the several stages has been attributed to the difference in the mode of operation; thus, the stimulation has been regarded as owing to nervous action, while the narcotism and depression have been thought to be due to the after absorption. It is more probable that each is due to the absorption, but in a lesser or greater degree.

There is a disparity of power evinced by the several articles included under this head. Illustration of this. And there is great diversity in the modes of affecting particular organs. Illustration.

This has been attributed to an elective operation, not only referable to different organs, but to different parts of the same organ.

In selecting the article to be used, this circumstance is of importance, from the application which can be made to particular cases, and in fulfilling various indications.

In large doses, all of them are poisonous. Death occurs from the suspension of the powers of the brain, and the nerves which originate from it; asphyxia is a consequence. Explanation of the relation between the brain, pulmonary apparatus, and the heart—the tripod on which life stands; and of the effect upon the blood and its secondary consequences. Best mode of obviating this.

Narcotics are operative when applied to any part by which they can be absorbed.

There is a great difference in the constitutional susceptibility to their impression, for, while some persons are affected violently and disagreeably, others are kindly affected by them.

Nor is there any class in which a tolerance to their impression is more decided; this is due to the accommodation of the powers of life to their use, and partly to disease. A point may ultimately be reached where this susceptibility is lost, and then natural depression follows. The tolerance of large quantities is due to the non-corrosive action upon the tissues, but still they must be regarded as irritative. Difficulty of suspending the habitual use of them; reason.

Importance, when their use has to be continued, of substituting one for another, and changing the surface to which applied.

Narcotics are employed medicinally, either for their stimulating or sedative effects. Cases where the first are advantageous. Mode in which they are antispasmodic. Cases in which they are important as sedatives, with relief of pain. Evil effects of pain, and the necessity of removing it.

Necessity of removing plethora, and especially determination to the brain, before their use.

OPIUM, *U. S.*

Opium.

The concrete juice of the unripe capsules of the *Papaver somniferum* or *Poppy*. This plant typifies the *Papaveraceæ*. Varieties of the poppy; *White* and *Black*. Description of the plants, and characters by which they are distinguished. These are cultivated in Asia, but have been transferred to Europe and this country.

Form and size of the capsules. Structure and internal arrangement. Appearance and color of the seeds.

Constituents of the capsules, and mode of employment.

The seeds innocuous, nutritious, and contain a fixed oil.

Poppy oil. Uses in pharmacy and the arts.

Modes of obtaining opium, and the difference of quality depending upon the operation. Adulteration and factitious preparations.

General characters of opium; form; color externally and internally; coverings; weight of masses; consistence in the fresh and dry state; appearance of a cut surface; inflammability; odor; taste; mode of powdering.

Detection of adulterations. Solubility in water and alcohol; ether and vinegar.

Commercial History.—Varieties of opium. These are: 1. *Turkey Opium*, including Smyrna and Constantinople.

Smyrna Opium.—Size of masses; shape; color, and coverings; smell. Relative value, and reason for the preference given to it.

Constantinople Opium.—Form and size of the masses; color; covering; odor.

2. *Egyptian Opium.*—Form; appearance; relative value.

3. *India Opium.*—Distinguished as *Patna*, *Benares*, and *Malwa*. Source; appearance and distinctive properties of these varieties; rarely met with in this country, but sent to China.

Constituents. *Morphia*, *Narcotina*, *Codeia*, *Narceia*, and *Meconic acid* are the most important; but numerous other principles exist in it, and render its composition elaborate. Sketch of its chemical history.

Morphia, U. S.—State in which it exists in opium. Mode of obtaining it.

Form and appearance of the crystals; color; taste. Solubility in water, in alcohol; in alkaline solutions, in acids. Insolubility in ether. Effect of heat. Nature and composition. Tests.

Narcotina.—Mode of obtaining it, founded on solubility in ether. Form and appearance of the crystals. Taste. Solubility in water and alcohol. Effects of acids. Mode of distinguishing it from morphia.

Codeia.—Characteristics. Nature, and combinations.

Other principles.

Reagents with solutions of opium. Test proposed by Dr. Hare.

Medical Properties.—In whatever way employed, opium makes a decided impression on the nervous centres, and its effects are to be referred to them. Evidences of the disturbance of the organic and animal functions and movements. Symptoms of its stimulative action in small doses, and of its sedative in larger, and of its final depressing effect. Relation of these to each other. Remarks on the anomalous action on the secretions. Effect on skin. Proofs of absorption. Poisonous impression. Symptoms and diagnosis. Post-mortem appearances. Treatment. Peculiarities in the constitution of individuals relative to opium. Age and habit. Disease, &c. Therapeutic indications, and employment. Diseases in which it fulfils these indications. Contraindications.

Administration. Dose, gr. j, in pill or powder, by itself or in combination. The preparations are numerous.

PILULÆ OPII, U.S.; *Opium Pills.* Mode of preparing. Each pill contains gr. j of opium.

PILULÆ SAPONIS COMPOSITÆ, U.S.; *Compound Pills of Soap.* Made of soap and opium in the proportion of gr. iv of soap to gr. j of opium.

TINCTURA OPII, U.S.; *Tincture of Opium. Laudanum.*

Mode of preparation. Strength 37½ grs. to fluidounce. Dose, ℥xiij, or gtt. xxv. Caution with regard to sediment.

TINCTURA OPII DEODORATA, U. S.; *Deodorized Tincture of Opium.* Mode of preparation. Properties. Chemical nature. Strength 37½ grs. to fluidounce. Remarks on its uses and advantages.

TINCTURA OPII ACETATA, U.S.; *Acetated Tincture of Opium.* —Mode of preparing. Chemical character. Strength 48 grs. to a fluidounce. Dose, ℥x or gtt. xv—xx.

TINCTURA OPII CAMPHORATA, U.S.; *Camphorated Tincture of Opium. Paregoric Elixir.*—Mode of preparation and ingredients. Contains 2 grs. of opium to fluidounce. Dose, f℥j to f℥ss. Less for children; 18 drops equal to one of laudanum.

VINUM OPII, U.S.; *Wine of Opium. Sydenham's Laudanum.* —Constituents and preparation. Dose, ℥x, or gtt. xx. Contains 60 grs. of opium to f℥j.

ACETUM OPII, U.S.; *Vinegar of Opium.* BLACK DROP.—Ingredients and mode of preparation. Contains 75 grs. of opium to the fluidounce. Dose, ℥x.

CONFECTIO OPII, U.S.; *Confection of Opium; Theriaca.*—Ingredients and preparation. Strength, 1 gr. opium to 35 grs.

EXTRACTUM OPII, U.S.; *Extract of Opium.*—Advantages for some purposes over opium. Twice as strong.

Salts of Morphia.

MORPHIÆ SULPHAS, U.S.; *Sulphate of Morphia.*—Mode of preparation. Appearance and form of the crystals. Solubility in water and alcohol. Taste. Adulterations and tests. Dose, gr. $\frac{1}{8}$ to $\frac{1}{4}$.

LIQUOR MORPHIÆ SULPHATIS, U.S.; *Solution of Sulphate of Morphia.*—Made in the proportion of gr. j to the fluidounce. Dose, f℥j to ij.

MORPHIÆ MURIAS, U.S.; *Muriate of Morphia.*—Mode of preparation. Characteristics. Dose, gr. $\frac{1}{8}$ to $\frac{1}{4}$.

MORPHIÆ ACETAS, U.S.—Mode of preparing, and characteristics. Dose, gr. $\frac{1}{8}$ to $\frac{1}{4}$.

Remarks on the external application of the salts of morphia.

LACTUCARIUM, *U.S.*

The inspissated juice of the *Lactuca sativa; Garden lettuce.*— Cultivated in Europe and this country.

Description of plant. Mode of collection.

Properties; appearance; consistence; odor; taste; relation to water.

Constituents.

Peculiarities as an anodyne. Employment. Dose, grs. ij to iij.

SYRUPUS LACTUCARII, U.S.; *Syrup of Lactucarium.* Dose, f℥j to f℥ij.

Remarks on the SOLANEÆ.

HYOSCYAMI FOLIUM, *U.S.*

Henbane Leaf.

The leaves of *Hyoscyamus Niger.*

HYOSCYAMI SEMEN, *U.S.*

Henbane Seed.

The seeds of *Hyoscyamus Niger.*

Description of the plant; a native of Europe, but has been cultivated in this country. Grows wild in England. Variety, *H. albus.*

Time at which the *leaves* are plucked.

Appearance; color; odor; taste.

Causes of irregularity in the activity of the leaves.

Form, color, and size of *seeds.* Taste.

Relation to water and alcohol.

Constituent, a peculiar alkaloid principle, *Hyoscyamia.* Form; color; taste; solubility.

Medical Properties.—Character as a narcotic; difference between it and opium. Effect in large, and in inordinate doses. Employment therapeutically. Administration.

EXTRACTUM HYOSCYAMI, U. S.; *Extract of Henbane.*—Mode of preparing from the fresh leaves. Characters of the preparation. Dose, gr. ½ to iij. Advantages of combination.

EXTRACTUM HYOSCYAMI ALCOHOLICUM, U. S.; *Alcoholic Extract of Henbane.*—Reason for its introduction. Mode of preparation. Dose, gr. j to ij.

EXTRACTUM HYOSCYAMI FLUIDUM, U. S.; *Fluid Extract of Henbane.*—Mode of preparation. Dose, gtt. v to x.

TINCTURA HYOSCYAMI, U. S.; *Tincture of Henbane.*—Dose, gtt. xx. to f℥j.

BELLADONNÆ FOLIUM, *U. S.*

Belladonna Leaf.

BELLADONNÆ RADIX, U. S.; *Belladonna Root.*

The leaves of *Atropa belladonna. Deadly nightshade.*

Description of the plant. An inhabitant of Europe, but introduced into the gardens of this country.

All parts of this plant are highly energetic, but the leaves alone have been recognized as officinal.

Properties of the dried leaves; color; appearance; odor; taste. Powder.

They contain a peculiar principle, *Atropia.*

Medical Properties.—Those of a potent narcotic, having a decided effect in dilating the pupil.

Effect on throat and skin. Poisonous action. Employment in disease.

Administration of powder. Made into pill. Dose, gr. j.

EXTRACTUM BELLADONNÆ, U. S.; *Extract of Belladonna.*—Mode of preparing from fresh leaves. Consistence; color; odor; taste. Dose, gr. ¼ to gr. j.

If increased, it should be done cautiously.

Reason for commencing with a small dose.

EXTRACTUM BELLADONNÆ ALCOHOLICUM, U. S.; *Alcoholic Extract of Belladonna.*—Reason for its introduction. Characters. Dose, the same.

TINCTURA BELLADONNÆ, U. S.; *Tincture of Belladonna.*—Dose, gtt. v to x.

UNGUENTUM BELLADONNÆ, U. S.; *Ointment of Belladonna.*—Mode of preparing. Employment as a local agent.

EMPLASTRUM BELLADONNÆ, U. S.; *Belladonna Plaster.*—Mode of preparing; form; employment.

ATROPIA, U. S.—Mode of preparation. Chemical character of this principle; solubility in water and alcohol; reaction with acids, forming salts. Odor, unpleasant when impure. A most energetic poison. Dose, gr. $\frac{1}{30}$. Uses. External application.

ATROPIÆ SULPHAS, U. S.; *Sulphate of Atropia.*

STRAMONII FOLIUM, *U. S.*

Stramonium Leaf.

The leaves of the *Datura Stramonium.*

STRAMONII SEMEN, *U. S.*

Stramonium Seed.

The seeds of *Datura Stramonium.*

Description of the plant. An inhabitant of this country and of Europe. It is here called *Jamestown Weed.* Two varieties. All parts of the plant are energetic.

Time when the *leaves* should be gathered; odor; taste.

The *seeds* are ripe in the autumn. Form; size; color; taste.

Relation of both to water and alcohol.

Contain a peculiar principle, *Daturia.*

Medical Properties.—Resembles hyoscyamus. Therapeutic application. Poisonous effects. Mistake made with the young plants.

Administration. The powdered seeds are sometimes employed. Dose, gr. j.

EXTRACTUM STRAMONII, U. S.; *Extract of Stramonium.*—Mode of preparing from the leaves. Color and odor. Dose, gr. j to iij.

EXTRACTUM STRAMONII ALCOHOLICUM, U. S.; *Alcoholic Extract of Stramonium.*—An alcoholic extract. Dose, gr. ¼ to j.

TINCTURA STRAMONII, U. S.; *Tincture of Stramonium.*—Made from the seeds. Dose, gtt. x to xx.

UNGUENTUM STRAMONII, U. S.; *Ointment of Stramonium.*—Mode of preparing it. Uses.

DULCAMARA, *U. S.*

Bittersweet.

The stalks of *Solanum Dulcamara*, sometimes called *Woody Nightshade.* An inhabitant of this country and of Europe.

Description of the plant. All parts of it are energetic. Berries poisonous.

Stalks, time when gathered. Form; appearance; color; structure; odor; taste.

Contain a principle called *Solania.* Characters.

Relation to water and alcohol.

Medical Properties.—Narcotic and alterative. Action on secretions. Effects of over-doses.

DECOCTUM DULCAMARÆ, U.S.; *Decoction of Bittersweet*—Mode of preparation. Dose, f℥ij, three or four times daily.

EXTRACTUM DULCAMARÆ, U.S.; *Extract of Bittersweet.*—Mode of preparing. Dose, grs. v to x.

EXTRACTUM DULCAMARÆ FLUIDUM, U.S.; *Fluid Extract of Dulcamara.*—Advantages as an alcoholic extract. Dose, f℥j to f℥ij.

Remarks on LOGANIACEÆ.

HUMULUS, *U.S.*

Hops.

The strobiles of *Humulus Lupulus.* A European and American plant.

Description.

Strobiles; dried; form; color; odor; taste. Relation to water and alcohol.

Contain a bitter principle; volatile oil, and

LUPULINA, U.S., *Lupulin*—which is the powder attached to the strobiles. Mode of collecting it; appearance; color; cohesion; odor; taste; inflammability. Solubility in alcohol.

Medical Properties.—Possesses properties of a bitter, but no stimulative power. A mild anodyne. Cases to which adapted.

Hop Pillow.

Hop Fomentation.

INFUSUM HUMULI, U.S.; *Infusion of Hops. Hop tea.*—Mode of preparation. Dose, f℥j to ij or more.

Decoction objectionable.

TINCTURA HUMULI, U.S.; *Tincture of Hops.*—Dose, f℥j to f℥ss.

Lupulin is given in pill. Dose, grs. vj to xij. Use.

TINCTURA LUPULINÆ, U.S.; *Tincture of Lupulin.*—Mode of preparing. Dose, f℥ss to j.

EXTRACTUM LUPULINÆ FLUIDUM, U. S.; *Fluid Extract of Lupulin.*—Dose, f℥ss to f℥j.

OLEORESINA LUPULINÆ, U. S.; *Oleoresin of Lupulin.*—Used for pills.

EXTRACTUM CANNABIS, *U. S.*

Extract of Hemp.

An alcoholic extract of the dried tops of *Cannabis sativa*, variety *Indica*. It is an inhabitant of Persia, Caucasus, and the hills of the north of India. Resemblance to common hemp.

The dried hemp plant is called *Gunjah*, and the concreted resinous exudation from the leaves, stalks, &c., is called *Churrus*.

In the plant there are a volatile oil, and a peculiar active principle, *Cannabin*.

Characters of *Cannabin;* relation to alcohol and ether.

Mode of obtaining the extract.

Medical Properties.—Power of exhilaration; effects upon sensation and motion; control over pain; danger of using it in too large doses. Dose, gr. j to v.

TINCTURA CANNABIS, U. S.; *Tincture of Hemp.*—Preparation. Dose, gtt. x—xx.

EXTRACTUM CANNABIS PURIFICATUM, U. S.; *Purified Extract of Hemp.*

CAMPHORA, *U. S.*

Camphor.

A peculiar concrete substance, derived from *Camphora officinarum*, and purified by sublimation.

Description of the plant. Belongs to *Laurineæ*. The whole of it contains *Camphor*. It is a native of the mountainous districts of China and of Japan, and other eastern islands.

Mode of procuring the camphor.

Crude Camphor.—Form; color; odor; taste.

A variety is the Japan, which has a pink hue.

Mode of refining camphor. Form which it assumes; appearance of the masses; fracture; crystalline structure; feel; odor; taste; solubility in water; in alcohol and oils; volatility.

Mode of powdering.

Composition. True chemical nature. *Oxide of Camphene.*

Another variety of *Camphor*, *Borneo* or *Sumatra*, from the *Dryobalanops Camphora.*

Form and characteristics. Difference between it and the officinal. Value.

Oil of Camphor.—Consistence; color; odor; taste.

Composition. Commercial source.

Medical Properties.—A local irritant, but a sedative to the circulation, while it rouses nervous action and determines to the skin. Reaction follows the decided depressing effects. Action in over-doses.

Proofs of absorption. Cases in which used. Action on urinary organs.

Administration in powder or pill. Dose, grs. v to x. In emulsion.

AQUA CAMPHORÆ, U. S.; *Camphor Water.*—Mode of preparing. Strength. Dose, f℥ss to j.

SPIRITUS CAMPHORÆ, U. S.; *Spirit of Camphor.*—Strength. Uses. Dose, f℥ss to j.

The external application of camphor. Liniments of camphor.

LINIMENTUM SAPONIS, U. S.; *Soap Liniment.*

Linimentum Saponis Camphoratum; Camphorated Soap Liniment. Opodeldoc.—Reason of the difference of consistence in the two. Uses.

CONIUM, *U. S.*

Hemlock.

The leaves of the *Conium maculatum.*

The fruit is sometimes used.

Description of the plant. Belongs to the *Umbelliferæ.* A native of Europe, but has been introduced and cultivated in this country.

Effects of temperature and climate upon it.

Time at which the leaves should be gathered. Mode of preservation. All parts are endowed with activity, odor, and taste in the fresh state.

Color and appearance of the dried leaves, and of the powder. Odor; taste.

Relation to water and alcohol.

There exists in the plant a peculiar principle, *Conia*, and an odoriferous oil.

Characters of *Conia*. Odor; taste; nature; test. Solubility in water, in alcohol, and in ether. Effects upon the system.

Distinction between this plant and *Cicuta*.

Medical Properties.—Knowledge possessed of it by the ancients, and the uses made of it. In the primary impression, stimulating. In the secondary, sedative; possessing extreme power over the brain and nervous system in large doses. Poisonous effects. Therapeutical employment.

Administration. Dose of powder, gr. j to v.

EXTRACTUM CONII, U.S.; *Extract of Hemlock.*—Mode of preparing from the fresh leaves. Appearance; color; odor; taste. Dose, gr. j to iij. Caution with respect to different parcels from variation of strength. Causes of inequality. Combinations.

EXTRACTUM CONII ALCOHOLICUM, U.S.; *Alcoholic Extract of Hemlock.*—Reason for its introduction.

EXTRACTUM CONII FLUIDUM, U.S.; *Fluid Extract of Hemlock.*—Mode of preparing. Dose, gtt. v—x.

TINCTURA CONII, U.S.; *Tincture of Hemlock.*—Strength. Uses. Dose, gtt. xx to xxx.

External employment of *Hemlock*.

ÆTHER, *U.S.*

Ether.

Formerly *Æther sulphuricus.*

Mode of preparation and purifying. Rationale.

Chemical nature, and *Oxide of Ethal.*

ÆTHER FORTIOR; *Stronger Ether. Purified Ether.*

Properties. A colorless, limpid liquid. Odor; taste; sp. gr. 0.750; volatility; inflammability; change from age; solubility in water; in alcohol.

Effect when applied to the skin.

Medical Properties.—Effects of swallowing it undiluted. Action upon the brain, upon the system generally. Rapid absorption and elimination. Tolerance to its impression.

Employment under circumstances of debility, and in nervous affections.

Mode of administration. Dose, f℥ss to ℥j, properly diluted. Mode of thoroughly incorporating it with water.

External use.

Employment as an *Anæsthetic agent.*

COLLODIUM, U. S.

SPIRITUS ÆTHERIS COMPOSITUS, *U. S.*

Compound Spirit of Ether.

Hoffmann's Anodyne.—Mode of preparing. Constituents.

Characters; odor; taste; test for its genuineness.

Employment as a composing anodyne. Cases in which useful. Dose, f℥ss to j, mixed with water.

CHLOROFORMUM, *U. S.*

Chloroform.

Mode of preparation. Composition.

CHLOROFORMUM PURIFICATUM, U. S.; *Purified Chloroform.*

Properties; consistence; color; odor; taste. Sp. gr. 1.49. Size of drop. Solubility in water and alcohol.

Employment as an anodyne; as an anæsthetic agent. Danger from its use. Mode of producing death. Dose, gtt. x to xxx.

SPIRITUS CHLOROFORMI, U. S.; *Spirit of Chloroform.*—Dose, f℥j.

MISTURA CHLOROFORMI, U. S.; *Mixture of Chloroform.*—Composition. Dose, f℥ij to f℥ss.

LINIMENTUM CHLOROFORMI, U. S.; *Liniment of Chloroform.*—External employment.

EXCITO-MOTOR STIMULANTS.

By the expression which is used to designate this class, it is meant that, with other effects, they are capable of so impressing the spinal centre as to rouse into action the motor nerves. Sometimes this is effected with so much intensity as to produce inordinate muscular spasmodic action, amounting to convulsions. They are used either to arouse muscular structure into action, to accomplish a particular purpose, or to gently bring about lost motor power in muscles. In some of them, there is a decided narcotic action; those here introduced are remarkable for their impression on the nervous system.

NUX VOMICA, *U.S.*

Nux Vomica.

The seeds of the *Strychnos Nux Vomica.* An inhabitant of India—the Coromandel Coast, and Ceylon.

Description of the plant.

Properties of the seeds; size; form; color; structure; density; odor; taste. Difficulty of powdering. Relation to water and alcohol.

Contains *Strychnia* and *Brucia*, and an acid, *Igasuric.*

Properties of strychnia; of brucia. Tests. Solubility. Chemical reaction. Salts.

Medical Properties.—Effects in small doses. Action upon the nervous system. Symptoms of inordinate impression. Poisonous action. Proofs of absorption.

Employment in paralysis; as a tonic.

Mode of exhibition in powder. Dose, grs. ij to iij, in pills. repeated two or three times daily.

EXTRACTUM NUCIS VOMICÆ ALCOHOLICUM, U. S.; *Extract of Nux Vomica.*—An alcoholic extract. Mode of preparation. Characters; Dose, gr. ½ to ij in pill.

TINCTURA NUCIS VOMICÆ, U.S.; *Tincture of Nux Vomica.*—Mode of preparing. Dose, gtt. x to xx.

STRYCHNIA, U.S. Properties. Chemical tests.

Employment of *strychnia.* Dose, gr. $\frac{1}{10}$ to $\frac{1}{16}$, first dissolved in alcohol, and added to conserve of roses to form pill. Endermic application. Quantity used, gr. ½. Salts of strychnia; *Acetate, Nitrate,* &c. Uses.

STRYCHNIÆ SULPHAS, U.S.

IGNATIA, *U. S.*

Ignatia.

Seeds of Strychnos Ignatia. '*Bean of St. Ignatius.*—Found in the Philippine Islands.

Properties of the seeds.

Contain brucia and strychnia.

EXTRACTUM IGNATIÆ ALCOHOLICUM, U. S.—*Alcoholic Extract of Ignatia.*

Employment. Dose, gr. ½ to j.

Remarks on the *Strychneæ.*

ERGOTA, *U. S.*

Ergot.

Secale cornutum; Spurred Rye.—The diseased seeds of *Secale cereale.*

Produced by the conversion of the grain into a fungus, which has been called, by De Candolle, *Sclerotium clavus;* by Mr. Quecket, it is regarded as diseased from the presence of a fungus, *Ergotætia abortifaciens.*

Difference of opinion among naturalists.

Ergot not confined to rye.

Characters. Form and size of the grains; color; external and internal appearance; odor; taste; changes which it undergoes.

Contains *Ergotin,* and an *oil.*

OLEUM ERGOTÆ.—Properties.

Medical Properties.—Effects on the cerebrum, on the circulation and stomach; peculiar effect upon the uterus; deleterious impression on the constitution when used in food; employment in parturition; use as a hæmostatic, and with other effects.

Mode of exhibition. Given in powder. Dose, ℈j, repeated, if necessary, in parturition; or grs. x to xv, two or three times daily, for other purposes.

The *infusion* made by adding ʒj to fʒiv boiling water, macerating until cold, and straining. Dose, fʒj.

Tincture of ergot. Dose, fʒj.

VINUM ERGOTÆ, U.S.; *Wine of Ergot.*—Mode of preparation. Dose, fʒj to ij.

EXTRACTUM ERGOTÆ FLUIDUM, U.S.; *Fluid Extract of Ergot.*—Mode of preparation, contains acetic acid. Dose, fʒj.

Oil of ergot given in doses of gtt. xx to xl.

ARTERIAL SEDATIVES.

HITHERTO we have had under consideration those articles which produce an excitant impression upon the actions and functions of the system. We have now to consider such as have a reverse tendency, or depress the powers of life and the movements of the organs.

Sedatives are divided into such as are more especially directed to the arterial, and such as act upon the nervous system; but from the close connection between the two systems, there is difficulty of discrimination. They are divided into two classes, from the more decided effects which they present upon the one or other of the two systems.

Arterial Sedatives may be defined to be substances which depress the circulation; diminish the force and frequency of the heart's action; lower the pulse; diminish the number of respiratory inspirations; but which, with reduction of power, do not derange the actions of the nervous system.

In connection with the effect upon the general circulation, is an impression upon the capillary circulation. This is attended with reduction of heat; and hence the term REFRIGERANTS has sometimes been employed.

They are used in diseases of excitement, where this is preternatural, with heat and fever; and in inflammations.

In such affections there is frequently an alteration of the blood, with superabundance of plastic material. This results from a change induced in the organic constitution of the blood by the excitement or inflammation; one of the modes of acting beneficially is by the prevention of such change. Explanation.

They are contra-indicated in typhoid affections, and in those of debility generally.

While acting in the way stated, in larger quantities or more concentrated they become irritant. Illustrations.

They are employed, not as substitutes for actual depletion, where this is clearly indicated, but as valuable adjuvants to this treatment. Reason for this statement, and explanation.

ANTIMONIUM, *U. S.*

Antimony.

Changes of opinion with respect to this metal. The preparations of it are among the most depressing which can be brought to bear upon the animal economy; and are active in proportion to their solubility. When applied locally, they are irritant, and induce a peculiar impression, which upon the skin is pustular, followed by an eschar.

To the stomach and bowels they have a special tendency, which is only modified by peculiar circumstances; this is apparent in any way that they may be used.

When brought to bear upon the system, depression is exhibited by reduction of the pulse and of the heart's action, by diminished frequency of the respiratory movements, by relaxation of the cutaneous and mucous surfaces, and increase of secretion from the emunctories generally. The muscular system is also influenced and rendered less capable of effort, while the nervous system is calmed into quiescence.

The effect upon the pulse is very decided, and the reduction of the number of respiratory acts is in accordance with it.

A peculiarity possessed by antimonials is persistence in their effects. This is exhibited by a continuance of them after the exhibition has been suspended. When they are exhibited for a length of time, the system comes so fully under their influence, as to give rise to the expression *Antimonial saturation.* Symptoms of this condition.

The absorption is proved by detection in the viscera, in the blood, and in the urine.

There is no difficulty in understanding how the soluble preparations are active by absorption; when they are inert from insolubility, they become active by chemical agents in the

stomach and in the tissues, which render them soluble. Explanation of these means.

Under particular circumstances, an avoidance of their operation upon the stomach and bowels may be secured, so as to produce a *tolerance* of administration. Mode of securing this, and circumstances which aid it. Advantage taken of this tolerance in treating disease; and the rule advocated that, where tolerance has ceased and disorder of the stomach has come on, the medicine should be suspended. Necessity of strict adherence to regimen when employing antimonials.

Modifying circumstances of age and sex upon the administration.

The poisonous effects induced by excessive or accidental exhibition are characterized by intense prostration. Symptoms. Or by irritation of the internal organs, with the same impression upon the general system. Mode of treating such cases.

Vomiting and purging are in themselves sources of depression, and these may add to that induced by the preparations.

Where applied to the skin, and an irritant impression made, the same tendency to prostration may be exhibited.

The contra-indicating conditions are irritability of the stomach and debility of the general system.

From what has been stated, it becomes apparent that the antimonial preparations are best employed in inflammatory affections and in those of high febrile excitement. In these cases, not only is their depressing influence salutary, but they prevent the results of inflammatory action upon the blood, and the generation of plastic products. They are best suited, therefore, to the early stages.

When given in exceedingly minute doses, no immediate impression is perceived; but after some time the effects are exhibited, and disease of a chronic character may yield to them. In these effects resides what has been termed the *alterative action*.

Metallic Antimony is active only in proportion to the change which it undergoes in the stomach; this depends upon the amount of muriatic acid or soluble chlorides there met with. It is consequently an uncertain mode of exhibition.

ANTIMONII OXIDUM, *U. S.*

Oxide of Antimony.

Mode of preparing. Rationale. Properties. Used for preparing *Tartar Emetic.*

ANTIMONII ET POTASSÆ TARTRAS, *U. S.*

Tartrate of Ammonia and Potassa.

TARTAR EMETIC; *Antimonium Tartarizatum.*

Mode of preparing. Rationale.

Form of crystals. Color. Transparency. Effects of exposure. Taste. Solubility in water and alcohol.

Changes in watery solution.

Incompatibles. Antidotes.

Reason for preferring the crystals to the powder. Adulterations.

Medical Properties.—Certainty and value as an antimonial preparation. Effect upon the stomach and system. Poisonous effects. Large quantities that may be taken by establishing a tolerance. Cases to which adapted. Value in diseases of the chest, and stage of administration. Mode of preventing plastic formations. Danger of inordinate doses. Combinations. Dose, gr. $\frac{1}{12}$—$\frac{1}{8}$—$\frac{1}{4}$, repeated every two hours, under ordinary circumstances.

Employment as an alternative in dose of gr. $\frac{1}{32}$ to $\frac{1}{16}$ and repeated, so that gr. $\frac{1}{4}$ to $\frac{1}{2}$ may be taken in the twenty-four hours.

VINUM ANTIMONII, U. S.; *Antimonial Wine.*—Mode of preparation. Strength, grs. ij to f℥j. Dose, gtt. xv to f℥j; for children, less.

UNGUENTUM ANTIMONII, U. S.; *Antimonial Ointment.*—Mode of preparing. Effect upon the skin. Mode of applying it. Cases to which adapted.

PILULÆ ANTIMONII COMPOSITUM, U. S.; *Compound Pills of Antimony.*—Plummer's Pills. Composition. Dose.

EMPLASTRUM ANTIMONII, U.S.; *Plaster of Antimony.* Strength. Uses.

Sulphurets of Antimony.

These are three.

ANTIMONII OXYSULPHURETUM, U.S.; *Oxysulphuret of Antimony. Kermes Mineral.*—Mode of preparation. Characters and employment.

Golden Sulphuret. Preparation and uses.

ANTIMONII SULPHURATUM, U.S.; *Sulphurated Antimony. Precipitated Sulpuret of Antimony.*—Mode of preparation. Rationale.

Color; form; taste. Solubility in water. Composition.

Medical Properties.—All the sulphurets uncertain on account of the varied proportion of the oxide in their composition, and the amount of a chemical agent in the stomach. Used more as alteratives. Dose gr. ½ to 3. Combinations. Emetic, in grs. x to xx.

PULVIS ANTIMONIALIS.

Antimonial Powder.

Not retained in the *U. S. Pharmacopœia.* Called *James' Powder.* Mode of preparation. Characters. Dose, gr. j to v. Causes of uncertainty.

POTASSÆ NITRAS, *U. S.*

Nitrate of Potassa.

Nitre. Saltpetre. Sources. A product of the soil in India; and prepared artificially. Found in plants.

Rough nitre. Mode of refining it.

Properties; form of crystals; transparency; appearance of surfaces. Taste. Fusible by heat. Contains no water of crystallization, only mechanically. Crepitates when thrown upon coals. Solubility in water. Composition. Uses in the arts.

Medical Properties.—Sedative to the circulation, and acts upon the skin and kidneys. Mode of acting as a refrigerant. Liquefacient action from continued employment. Poisonous local action. Employment in medicine as an adjuvant to depletory measures. Dose, grs. v to x, in powder or solution.

Nitrous Powders.—Composition.

THE VEGETABLE ACIDS.

Most agreeable as sedative and refrigerant remedies, and employed conveniently in the form of drinks. Abundant in fruits, where they are occasionally associated with vegetable jelly and sugar; the latter is usually added.

ACIDUM TARTARICUM, *U. S.*

Tartaric Acid.

Source. Mode of preparation.

Properties. Taste. Solubility. Mode of employment.

ACIDUM ACETICUM, *U. S.*

Acetic Acid.

Source. Officinal acetic acid, sp. gr. 1.047.

ACIDUM ACETICUM DILUTUM, U. S.; *Diluted Acetic Acid.*—Sp. gr. 1.006.

ACETUM, U.S.; *Vinegar. Distilled Vinegar. Concentrated.*

Employment in pharmacy, and as a prophylactic.

ACIDUM CITRICUM, *U. S.*

Citric Acid.

Contained in *lemons, oranges, &c.*

LIMONIS SUCCUS, U.S.; *Lemon-juice.*—Mode of preserving. Lemonade.

Pure citric acid in crystals. Color; taste; solubility; corrosive properties. Mode of preparation. Powder sometimes contaminated with tartaric acid. Test for this.

Solution made with ʒixss to Oj water, and 4 drops oil of lemons, to resemble lemon juice. From this lemonade may be made.

Advantage of this refreshing beverage. Its use in scurvy.

Necessity of employing the acids or fresh vegetable juices on long voyages as a preventive of scurvy.

SYRUPUS LIMONIS, U.S.; *Syrup of Lemon.*

SPIRITUS LIMONIS, U.S.; *Spirit of Lemon. Essence of Lemons.*

NERVOUS SEDATIVES.

SUCH substances as produce a marked diminution of nervous power, and affect the sensorial functions at the same time that they reduce the force of the circulation, are termed nervous sedatives. It is probable that in this case the primary impression is made upon the nervous system, which is manifested by abstraction of nervous power in organs under their control. All of them are, in inordinate quantity, most energetic poisons. Under proper regulation, they are applicable to diseases of excitement, whether nervous or vascular. In most of the systematic arrangements, they have been classed with the narcotics; but as they differ essentially from these in their mode of operation, they are best treated of by themselves.

DIGITALIS, *U. S.*

Digitalis.

The leaves of the *Digitalis purpurea. Foxglove.*

Description of the plant. Variety *D. alba.* A native of England and the continent of Europe, but cultivated in this country.

Mode of collecting, preparing, and preserving the leaves. Time when gathered. Should be of good size, well formed, and free from decay.

Properties of the dried leaves; color; odor; taste; cause of deterioration. Powder. Relation to water and alcohol. Two forms in the market. The best is the English.

Contains a peculiar principle, *Digitalin.*

Properties of this principle exceedingly active.

Medical Properties.—Has a decided sedative influence on the

nervous and arterial systems. It also acts upon the kidneys. Disagreeable effect upon the brain and stomach. When too great a quantity is taken, symptoms of poisoning, with extreme prostration, occur. Mode of relieving the poisonous effects. Effects in small doses upon the pulse. Degree of reduction. Peculiarity, that, when once induced, the effect is persistent. Another peculiarity is the tendency to a cumulative effect. Uses in diseases accompanied with excitement. Not a succedaneum for the lancet. Value in phthisis, mania, and affections of the heart. Importance of attending to position.

Administration in powder or pill, gr. ½ to j, repeated two or three times daily.

INFUSUM DIGITALIS, U.S.; *Infusion of Digitalis.*—Mode of preparation. Dose, f℥ss.

TINCTURA DIGITALIS, U.S.; *Tincture of Digitalis.*—Strength. Dose, gtt. x to xx.

EXTRACTUM DIGITALIS ALCOHOLICUM, U.S.; *Alcoholic Extract of Digitalis.*—Dose, gr. j to ij.

TABACUM, *U. S.*

Tobacco.

The leaves of the *Nicotiana tabacum.* A native of tropical America, but diffused. Varieties.

Mode of cultivating and curing tobacco.

Properties in the dried state. Relations to water and alcohol. Contains a peculiar principle, *Nicotina*, and from it is obtained an *empyreumatic oil.*

Medical Properties.—A powerful nervous sedative, capable of inducing inordinate depressing effects. Death occurs from its incautious use. Symptoms and pathological appearances. Active when applied to any of the surfaces. Action on the stomach; on the kidneys and secreting organs. Uses in muscular spasm, hernia, &c. Mode of administration. In doses of five or six grains it nauseates and vomits. Seldom given by the stomach in substance.

INFUSUM TABACI, U.S.; *Infusion of Tobacco.*—Mode of preparing. Half the quantity to be administered at once. Danger in giving by the rectum.

VINUM TABACI, U. S.; *Wine of Tobacco.*—Use as a diuretic; as a nauseant. Dose, gtt. x to xxx.

UNGUENTUM TABACI, U. S.; *Tobacco Ointment.*—Mode of preparing. Employment. Value as a discutient.

ACONITI RADIX, *U. S.*

Aconite Root.

The root of the *Aconitum napellus.*

ACONITI FOLIUM, *U. S.*

Aconite Leaf.

The leaves of the *Aconitum napellus.*

Called *Wolfsbane* and *Monkshood.* A native of Europe, but introduced into the United States.

Properties of the fresh leaves; odor; taste; effect upon the tongue. Root mistaken for the radish, hence specific name; the leaves, when young, have also been mistaken for celery.

Properties of the root. Form; color; odor; taste. Also of the dried leaves.

They both contain a peculiar alkaloid principle, *Aconitia*, connected with an acid, and a narcotic fatty oil. *Aconitia* is exceedingly active.

Medical Properties.—A powerful irritant to the skin, when locally applied. A powerful sedative, with more anodyne property than usually possessed by the class. Peculiar effect upon sensation. When carried too far, prostration and death are produced. Employment.

EXTRACTUM ACONITI ALCOHOLICUM, U. S.; *Alcoholic Extract of Aconite.*—Mode of preparing. Dose, gr. $\frac{1}{8}$ to j, cautiously administering.

TINCTURA ACONITI FOLII, U. S.; *Tincture of Aconite Leaf.*—Mode of preparing. Dose, gtt. xx to xxx.

TINCTURA ACONITI RADICIS, U. S.; *Tincture of Aconite Root.*—A saturated tincture. Dose, gtt. ij—v, three times daily. Caution.

Danger of confounding these two tinctures.

External use of the tinctures.

ACONITIA, U. S.—Mode of preparing. Employment.

ACIDUM HYDROCYANICUM DILUTUM, *U. S.*

Diluted Hydrocyanic Acid.

Prussic Acid.—Remarks on its production from certain plants; belonging to *Pruneæ* and *Amygdaleæ*, in connection with an oil, which, when obtained from bitter almonds, is called

OLEUM AMYGDALÆ AMARÆ, U. S.; *Oil of Bitter Almonds.*—Properties. Dangerous characters. When diluted with alcohol, constitutes the *Essence;* which is employed as a flavorer.

Cherry Laurel Water.—Mode of procuring it from the leaves of the *Prunus lauro-cerasus.* Not employed in this country, from its uncertain strength.

The *officinal Prussic Acid* is solely employed in medicine. Mode of preparing it. Rationale.

Method of obtaining it extemporaneously.

Properties; color; odor; taste; volatility; contains 22 per cent. of hydrocyanic acid; mode of keeping; acid reaction.

Medical Properties.—Most powerful sedative, and in large doses possessed of most energetic power. Effects on the system in small doses. Liability to affect the head. Suddenness of its poisonous impression. Mode of operating. Proofs of absorption. Mode of treatment. Employment. Dose, gtt. j to ij, in emulsion. External use.

POTASSII CYANIDUM, *U. S.*

Cyanide of Potassium.

Mode of preparation. Rationale.

Properties. Employment. Dose, gr. $\frac{1}{8}$ to $\frac{1}{4}$. Mode of administration and advantages.

ALTERATIVES.

ALTERATIVE medicines are those which produce such salutary changes in the organs and tissues as to permit healthy action in them to take the place of diseased action. Their operation is more especially directed to nutrition. When this is perverted and vitiated, they alter its character, and aid in the removal of the consequences, metamorphoses of structure.

Under proper control, they act slowly, but safely; no appreciable action is to be discovered; but with the removal of diseased structural conditions, disorderd functions assume their natural state.

Their impression appears, in the first instance, to be directed upon the fluids, and through them upon the solids; yet they may more or less affect the solids by a direct impression.

Many medicines, not placed in this class, exert an alterative action, in consequence of the secondary or therapeutical effects which are induced; but these do not bring their impression directly to bear upon nutritive materials, or nutrition; where benefit results in the treatment of diseases, it is a remote, and not a direct effect. Illustration.

The articles placed in this class produce injurious effects when carried too far, by breaking down the constitution of the blood, saturating the system, and inducing a state of cachexy, if not of disease, which assumes a peculiar character. These evil effects should always be anticipated, and guarded against.

A *liquefacient action* is attributed to them.

HYDRARGYRUM, *U. S.*

Mercury.

Quicksilver.—Sources in nature.

The metal may be swallowed without injurious consequences, passing through the bowels, and, unless undergoing chemical action, not inducing constitutional or other disturbance. The use of crude mercury abandoned.

When mercury is employed, it is in some form which enables it to come intimately into contact with the tissues and organs. The constitutional effects of all the preparations are similar. They are called *Alterants,* in consequence of the revolutionizing effect upon the system.

Mercury is absorbed, and taken into the system. Proofs of absorption. Necessity of conversion into soluble compounds, to be absorbed. Individuals exposed to the vapor of mercury liable to its impression. Mode in which mercury is most readily rendered soluble and fitted to enter the circulation. Even the vapor amenable to this mode of entrance.

Effects of mercury. These first perceived in the secerning and exhaling operations, the least and mildest impression being made upon the secretions. Particular action upon the liver.

When a constitutional impression has been made, it is evinced by the action upon the gums and the salivary glands; this is called *Salivation* or *Ptyalism.* When this constitutional impression is made, there are presented a general relaxation of the tissues, and a disposition to free secretion from all secerning surfaces, with an increase of absorption and diminution in the amount of solids and fluids, the glandular system feeling the impression. In this wasting operation, we have what has been termed the *resolvent* or *liquefacient* action. It is dependent upon the loss of animalized matter. The blood undergoes a change from mercurial influence, losing color, consistence, and coagulability. The plastic elements of this fluid are so reduced as to diminish its capability of nutrition; and this is a further source of waste of the body, as well as of an impaired and vitiated condition.

When the impression is inordinate, or in peculiar constitutions,

the entire animal system becomes so affected as to assume a morbid condition, and an especial disease is engrafted upon the system, called *Morbus mercurialis*, exhibited in local and general phenomena. Phenomena of this disease. Excessive salivation. Erythema mercurialis. Febris mercurialis. Nervous perturbation. Excessive general prostration.

Modes of detecting the early constitutional action. Difference in the susceptibility of individuals. Caution with respect to the cumulative effects, and circumstances which favor it.

The question discussed—Are mercurials sedative or stimulating?

Indications with which preparations of this metal are used:—

To produce salivation, with the view to a revulsive action. An improper application of them; reasons for this opinion.

To promote the secretions.—This covers a large field of application, as most acute diseases are attended with suppression or vitiation of the secretions, as fevers and inflammations. Under this head comes their application to derangements of the liver, with the view to acting on which organ they are constantly employed. Rules to be followed in their use, with a view to the above indication. Modes of best securing the end designed.

To control inflammatory action.—With this design, mercury is exhibited in the stage of inflammation, connected with the changes and new formations which result from its persistence. A modification of capillary action is brought about by it, and a dissolvent or liquefacient action exerted upon plastic deposits. Instances where the mercurial plan of treatment is best suited to the case. Explanation of the distinct adaptation of the sedative or antimonial preparations, and of the mercurial, to inflammatory conditions.

Greater adaptation to low grades of inflammation also explained.

To quicken absorption.—The mode of operation in this way having been shown, the advantage in dropsical affections, and tumefaction of glandular and other structures, can be understood as depending upon the general waste of the albuminous and animalized materials of the body. In quickening absorption, assistance is afforded to the action of other medicines, as diure-

tics. Assistance to the latter class of remedies in dropsy depending on hepatic derangement.

To produce a general revolutionizing impression.—As this more strictly appertains to the remedy as an alterative, it must be referred to the impression on the tissues and nutritive fluid, to a modification of nutrition, which depends on the liquefacient action. It is advantageous when it breaks up morbid tendency, or diseased deposits, but is liable to be carried too far and produce the injurious effects of the remedy. Remarks on the treatment of syphilis, and the abuse of mercurials. Necessity of an avoidance of mercury in scrofula, and cachectic states of the system.

The mode of administration, so as to produce and fulfil the several indications above stated, will be detailed under the head of each preparation.

Method of treating inordinate salivation, and of alleviating the constitutional impression when injurious.

Cautions with regard to exposure to cold, and means of guarding against it.

The preparations of mercury are numerous; they will be taken up in the following order:—

Of Metallic Mercury.

In all these preparations, the metal is most minutely divided, and barely changed in its chemical relations. It is, however, in a state to fit it for chemical action when brought in contact with substances which will render it soluble.

UNGUENTUM HYDRARGYRI, *U. S.*

Ointment of Mercury.

Mercurial Ointment—Blue Ointment.—Ingredients, and method of preparing. State in which the metal exists in it. Effects of age.

Properties; color. Appearance under a magnifying glass. Adulterations.

Employment. Mode of using it.

CAMPHORATED MERCURIAL OINTMENT.

EMPLASTRUM HYDRARGYRI, *U. S.*

Plaster of Mercury.

Constituents and mode of preparation. Consistence. Properties. Employment, and mode of application.

PILULÆ HYDRARGYRI, *U.S.*

Pills of Mercury.

Ingredients, and mode of preparation. Change in the metal.

Properties; consistence; color. Effect of age. Effect of too much trituration.

Proportion of mercury in it.

Adulteration.

Medical Properties.—A mild preparation. Used in doses of grs. v to x, with the design of acting on the bowels, followed by a mild cathartic. Advantages of such employment. Or with a view to a decided inpression on the tissues, in doses of grs. j, ij, iij, repeated at proper intervals. Combinations with it, and their advantages. Diseases in which thus used.

Mode in which it becomes active, and circumstances productive of energy.

HYDRARGYRUM CUM CRETA, *U.S.*

Mercury with Chalk.

Mode of preparation. State of the metal. Proportion of ingredients.

Color, appearance, and taste of the powder.

Employment as an alterant and antacid. Adaptation to the cases of children. Dose, grs. ij to iij: for adults, grs. v to xx. Combinations. Cause of irritation of the stomach sometimes produced by it.

HYDRARGYRUM CUM MAGNESIA; *Mercury with Magnesia.*—Properties and uses.

Oxides of Mercury.

HYDRARGYRI OXIDUM NIGRUM.

Black Oxide of Mercury.

Mode of preparing. Rationale.

Properties. Color of the powder; odorless; tasteless; insoluble except in acids. Effect of exposure.

Medical Properties.—An active but uncertain preparation; causes of this. Effect of the chlorides upon it. Employment. Dose, gr. ¼ in pill.

Black Wash.—Mode of preparation. Uses.

HYDRARGYRI OXIDUM RUBRUM, *U. S.*

Red Oxide of Mercury.

Mode of preparing. Rationale. Called *Red Precipitate.*

Properties. Form; color; taste; insolubility in water.

Medical Properties.—Escharotic, and therefore poisonous; used for external application. Cases to which adapted. Mode of using it.

UNGUENTUM HYDRARGYRI OXIDI RUBRI, U. S.; *Ointment of Red Oxide of Mercury. Red Precipitate Ointment.*—Mode of preparation. Uses.

Yellow Wash.—How prepared. Uses.

Chlorides of Mercury.

HYDRARGYRI CHLORIDUM MITE, *U. S.*

Mild Chloride of Mercury.

Calomel.—Mode of preparing. Rationale. Necessity for washing it.

Form when first prepared; mode of distinguishing between it and corrosive sublimate in mass. Form as kept in the shops; color; without odor or taste; insolubility in water and alcohol; effect of exposure; tests of purity.

Action of the stronger acids, and incompatibles. *Howard's Calomel.*

Medical Properties.—A mild preparation, which is much in use either to improve the secretions, to promote the activity of, and to unload the liver, or for a general impression.

The dose varies according to the purpose desired; as a purgative, larger doses are required (see calomel as a purgative). For the alterative impression, gr. $\frac{1}{2}$ to j may be given two or three times daily. In the treatment of inflammation, every two hours. Cases to which adapted. Combinations. Necessity of its conversion into a soluble compound, and the probable mode by which this is accomplished. Error of supposing it innoxious. Abuse and evil consequences of too liberal employment of it.

Advantage of employing it in very minute doses, as gr. $\frac{1}{6}$ repeated.

It enters into the composition of the *Compound Pills of Antimony* or *Plummer's Pills.*

HYDRARGYRI CHLORIDUM CORROSIVUM, *U.S.*

Corrosive Chloride of Mercury.

Corrosive Sublimate.—Mode of preparation. Rationale.

Properties. Form; transparency; taste; solubility in water and alcohol. Effect of exposure on solution.

Incompatibles. Tests.

Medical Properties.—In minimum doses, it acts as an alterative, and can produce all the effects peculiar to mercurials. May be managed so as to fulfil the several indications; but generally employed in chronic diseases. Dose, gr. $\frac{1}{16}$ to $\frac{1}{12}$. Administered conveniently with *Compound Syrup of Sarsaparilla.* Poisonous effect. Antidotes. Treatment.

External employment.

Iodides of Mercury.

HYDRARGYRI IODIDUM VIRIDE, *U.S.*

Green Iodide of Mercury.

Protiodide of Mercury.—Mode of formation.

Properties. Form; color; insolubility in water and alcohol. Solvents. Volatility. Effect of exposure. Composition.

Medical Properties.—An excellent resolvent. Cases to which adapted. Explanation of its action. Dose, gr. ¼ to 1, in pill.

Used externally in an ointment.

HYDRARGYRI IODIDUM RUBRUM, *U.S.*

Red Iodide of Mercury.

Biniodide of Mercury.—Mode of preparation. Rationale.

Properties. Form; color; volatility; solubility in iodide of potassium.

Medical Properties.—Acrid and poisonous in over-doses; in minute doses, alterative. Dose, gr. $\frac{1}{16}$, in pill, or compound solution.

Used extensively in the form of an ointment.

Salts of Mercury.

HYDRARGYRUM AMMONIATUM, *U.S.*

Ammoniated Mercury.

White Precipitate.—Chemically *Amido-Chloride of Mercury.* Mode of preparation. Rationale.

Composition.

Properties. Color of powder; taste; solubility; adulterations.

Irritant and poisonous. Accidents from taking it.

Used externally in the form of

UNGUENTUM HYDRARGYRI AMMONIATI, U.S.; *Ointment of Ammoniated Mercury.*—Mode of preparing. Uses.

Application of the dry powder.

HYDRARGYRI NITRAS.

Nitrate of Mercury.

Mode of preparation and rationale.

Composition and properties. From it is made

UNGUENTUM HYDRARGYRI NITRATIS, U.S.; *Ointment of Nitrate of Mercury. Citrine Ointment.*

Ingredients, and mode of preparation. Reaction of the constituents.

Properties; consistence; color. Changes which it undergoes from age.

Employment as a stimulating application. Cases to which adapted.

HYDRARGYRI SULPHAS FLAVA, *U.S.*

Yellow Sulphate of Mercury.

Turpeth Mineral.—Mode of preparation. Rationale.

Form—yellow powder; insoluble; acrid.

Employment as an errhine.

Sulphurets of Mercury.

HYDRARGYRI SULPHURETUM NIGRUM.

Black Sulphuret of Mercury.

Ethiops Mineral.—Mode of preparation. Composition.

Properties. Mild in its action. Dose, grs. v.

HYDRARGYRI SULPHURETUM RUBRUM, *U.S.*

Red Sulphuret of Mercury.

Cinnabar. Native. Mode of preparing artificially.

Properties. Form; color; volatility; composition.

Used for fumigation. Mode of employment. Cases in which used.

Employed in the arts under the name of *Vermilion.*

IODINIUM, *U.S.*

Iodine.

Source and discovery. State in which it exists in nature, and mode of obtaining it. Chemical character and properties. Form; color; odor; taste; volatility; solubility in water, in alcohol and ether.

Medical Properties.—Discovery of its effects in connection with *burnt sponge.* Effect upon the skin, and irritant impression. Same when taken too largely internally. Stimulative impression on the general system, and especially on the nervous cen-

tres. Action on the secerning organs. Proofs of absorption. The wasting effect upon the solids, and cachexy brought on by its improper administration. Resolvent effect. Poisonous action. Employment and advantages of iodine in goitre, and scrofula and other diseases.

Dose, gr. $\frac{1}{4}$, repeated two or three times daily.

TINCTURA IODINII, U. S.; *Tincture of Iodine.*—Mode of preparation. Reaction between ingredients. Dose, gtt. x to xx. Mode of administration. Convenient for local impression.

UNGUENTUM IODINII, U. S.; *Iodine Ointment.*—Mode of preparation. Properties. Employment.

POTASSII IODIDUM, *U. S.*

Iodide of Potassium.

Mode of preparation. Rationale.

Form; color; taste; solubility; effect on iodine in solution. Composition. Incompatibles.

Adulterations. Tests.

Medical Properties.—Effect in large doses irritating. Absorbed. General effects in small doses. Action on the kidneys. Injurious impression. Cases in which employed.

Dose, grs. ij to v. Mode of administration.

TINCTURA IODINII COMPOSITA, U. S.—*Ingredients, and mode of preparation.* Dose, gtt. x to xx.

LIQUOR IODINII COMPOSITUS, U. S.; *Compound Solution of Iodine. Lugol's Solution.*—Ingredients, and mode of preparation. Dose, gtt. x to xx. Cases to which adapted.

UNGUENTUM IODINII COMPOSITUM, U. S.; *Compound Ointment of Iodine.*—Used for the same purposes as the simple ointment.

Employment of *Iodine* and *Iodide of Potassium*, in the form of baths.

ARSENICUM, *U. S.*

Arsenic.

Inert in its pure state; but in combination one of the most energetic substances in the Materia Medica. Effects—local or

general. Symptoms of poisoning. Post-mortem appearances. Quantities which have occasioned death. Cause of exemption when surprisingly large quantities have been swallowed. Impression upon the stomach by small doses. Impression upon the system, and symptoms of a constitutional action. Production of slow poisoning. Proofs of absorption. Evidence of degeneration of the blood under its action. Antiseptic properties.

Anti-paroxysmal properties of the preparations. Employment in neuralgia, in skin diseases.

Contra-indications. Treatment of poisonous impression, and antidotes.

ACIDUM ARSENIOSUM, *U. S.*

Arsenious Acid.

Arsenious Acid; White Oxide of Arsenic.—Native, or prepared. Mode of formation.

Refined by sublimation.

Glacial White Arsenic.—Form; color; transparency; change from the action of the atmosphere; reduction to powder; solubility; odor when burnt; taste. Composition.

Medical employment. Dose, gr. $\frac{1}{16}$ to $\frac{1}{12}$, three times daily. Antidote, and mode of treating poisonous effects. External employment referred to *Escharotics*.

LIQUOR POTASSÆ ARSENITIS, *U. S.*

Solution of Arsenite of Potassa.

Fowler's Solution.—Mode of preparation. Ingredients and strength. Rationale.

Composition.

Employment. Uses to which adapted. Dose, gtt. v to x.

Antidotes.

LIQUOR ARSENICI ET HYDRARGYRI IODIDI, U. S.; *Solution of the Iodide of Arsenic and Mercury.*—Mode of preparation. Composition. Violent alterative. Dose, gtt. ij to vj.

EMETICS.

THIS class includes such substances as produce a discharge of the contents of the stomach through the cardiac orifice and the mouth. The act itself is called *Vomiting*. It is a highly complex operation, requiring the consent and simultaneous movement of a number of organs. These are the stomach and throat, the respiratory apparatus and abdominal muscles, with the nervous arrangement controlling them.

The question considered: is the stomach active or passive in the act of vomiting.

Reasons for supposing it but little active. Yet an antiperistaltic movement admitted to take place, which aids the operation of the other organs.

Mechanism of vomiting explained. The part performed by each organ interested, pointed out, and the several steps detailed.

Proof of the necessity of the nervous connections, and of their influence in the act of vomiting.

The doctrine of reflex action applicable.

Phenomena attendant upon the operation of an emetic.

Matters ejected from the stomach.

Other articles besides those included in this class may produce vomiting. Reasons for this given.

Besides the application to the stomach, an emetic effect may be induced if the articles are directed to other organs, as the rectum, the skin, or thrown into the bloodvessels.

An emetic effect not invariably produced; but an impression may be made on other organs, as the bowels, skin, or kidneys. Reasons for this.

There is considerable difference among the members of this class. Hence latitude of selection. They differ in power, in duration of effect, and capability of impressing the general system. Much depends upon whether their action is exerted locally upon the stomach, or takes place by absorption.

They are employed with a variety of indications:—

1. *With the view of evacuating the stomach.*—As in cases of ingestion of poisons; where there exist in the organ crude, indigestible substances, and where there is an overloaded state of it. Cases where they are advantageous in this point of view. Difficulty of action from insensibility of the brain, and means of obviating it.

2. *To unload contiguous viscera, and excite the portal circulation.*—Effects upon the pancreas, liver, lungs, and bowels. Cases in which this indication is important. Improper employment.

3. *To reduce arterial circulation, and relax the system.*—Effects of nausea. Effects from the direct action, and after depression; and from absorption. In this sense *Antiphlogistic.* Cases in point. Muscular relaxation attendant on their operation. Application of this. Free secretion from their use; and advantages of this mode of action.

4. *To produce powerful agitation of the whole system*, and a revolutionizing impression.—Employment with this indication in paroxysmal disease.

5. *With the view to revulsion by the stomach.*—Instances, in affections of the brain.

Contra-indications.

The amount of drink permitted to be taken should be regulated by the intention in prescribing them. By allowing diluents, or weak bitter infusions to be taken freely, we promote emesis, and at the same time facilitate their passage into the duodenum, and subsequent purgation. If the desire is to produce nausea, and retching, a limited supply should be permitted.

VEGETABLE EMETICS.

IPECACUANHA, *U.S.*

Ipecacuanha.

The root of the *Cephælis ipecacuanha*, a native of Brazil.

Description of the plant. Its discovery and introduction.

Mode in which the root is collected.

Called ANNULATED IPECACUANHA.

Properties; form; size of pieces; external conformation; portions into which separable; fracture; odor; taste; relation to water and alcohol. Powder.

Varieties. *Brown*, *Red*, and *Gray*. Difference between them.

Constituents. Emetia; fatty matter; starch, &c.

Emetia.—Characteristics. Effects of reagents.

UNDULATED IPECACUANHA; from the *Richardsonia scabra.*

STRIATED IPECACUANHA; from the *Psychotria emetica.*

Medical Properties.—Nature of its emetic action; prompt, safe, and efficient. Large doses not poisonous because not corrosive. Employed simply to unload the stomach, or impress the system. Cases.

Dose, grs. xx; repeated, if necessary. In smaller doses, well adapted to children. Mode of administration.

Advantages of combination.

Peculiar effects of ipecacuanha from idiosyncrasy.

Dose of *Emetia*, gr. ¼. Poisonous effects. Antidote.

Sudorific and expectorant effects will be considered under the appropriate classes.

VINUM IPECACUANHÆ, U.S.; *Wine of Ipecacuanha.*—Mode of preparation. Dose, f℥j to f℥ss, as an emetic.

EXTRACTUM IPECACUANHÆ FLUIDUM, U.S.; *Fluid Extract of Ipecacuanha.*—Mode of preparation. Strength. Dose, f℥ss to f℥j. Contains acetic acid.

SYRUPUS IPECACUANHÆ, U.S.; *Syrup of Ipecacuanha.*—Mode of preparation from the fluid extract. Strength. A mild medicine, used advantageously for children. Dose, f℥j to f℥ss. Used in cough mixtures.

GILLENIA, *U. S.*

Gillenia.

The root of the *Gillenia trifoliata* and *G. Stipulacea.*

Description of the plants. Indigenous.

The first is found on the eastern, the second on the western side of the Alleghany range.

Properties of the root. Form; structure; size; odor; taste. When gathered. Color of powder.

Contains extractive and resin.

Medical Properties.—Resembles ipecacuanha, but is not so powerful, and occasions less nausea. Dose, grs. xxx.

In small doses, tonic.

EUPHORBIA IPECACUANHA, *U. S.*

American Ipecacuanha.

Ipecacuanha Spurge.—Indigenous. Localities.

Description of the plant. Variation in the leaves.

Properties of the root in fresh and dried state.

Contains an acrid resin.

Medical Properties.—An irritating emetic. Has been used in fevers, &c. Dose, grs. x to xv.

EUPHORBIA COROLLATA, U. S.; *Large Flowering Spurge.*—Description of plant. Root similar.

Remarks on the *Euphorbiaceæ.*

SANGUINARIA, *U. S.*

Bloodroot.

Puccoon.—The root of the *Sanguinaria Canadensis.* An indigenous plant.

Description of the plant.

Properties of the root. Size; form; color; fracture; odor; taste. Color of powder.

Contains a peculiar principle, *Sanguinarina.*

Medical Properties.—A harsh, stimulating emetic, with some narcotic property. Dose, grs. v to xx.

Also expectorant in small doses.

TINCTURA SANGUINARIÆ, U. S.; *Tincture of Sanguinaria.*—Mode of preparing. Dose, f℥j—ij—iv.

As an expectorant, gtt. x to xx.

ACETUM SANGUINARIÆ, U. S.; *Vinegar of Blood Root.*—Dose, f3j. In small doses as an expectorant.

LOBELIA, *U. S.*

Lobelia.

The herb of *Lobelia inflata. Indian tobacco.* Indigenous.

Description of the plant. Time when gathered.

Appearance when dried. Color; odor; taste. Powder.

Contains a peculiar active principle, *Lobeliana*, with an acid.

Medical Properties.—A powerful emetic, producing most depressing effects on the economy; in some cases, has proved fatal. Cases in which efficacious. Expectorant properties. Dose in powder, grs. x to ʒj.

As an expectorant and nauseant, gr. j to v.

TINCTURA LOBELIÆ, U.S.; *Tincture of Lobelia.*—Strength. Dose, f3j, as an emetic; gtt. x to xx, as an expectorant.

Caution in the use of this preparation. Mode of treating the poisonous effects.

ACETUM LOBELIÆ, U.S.; *Vinegar of Lobelia.*—Dose, gtt. v to xx.

SCILLA, U.S.; *Squill.*—A harsh emetic. Treated of under *Diuretics.* Dose, grs. v to x.

TABACUM, U.S.; *Tobacco.*—Has been spoken of previously. Most depressing emetic. Dose, grs. v to vj.

PULVIS SINAPIS; *Mustard Flour.*—A quick, stimulating emetic. Uses. Dose, ʒij, in warm water.

MINERAL EMETICS.

ANTIMONII ET POTASSÆ TARTRAS.

Tartar Emetic.

Before described. More slow in operating, but more thorough in its action; the impression lasting a long time, attended by

the effects of an arterial sedative. Employed in fevers, with engorgement of the liver and embarrassed portal circulation; in hepatitis, &c.

Advantageous application in inflammatory affections. Dose, grs. ij, dissolved in f℥ij of water, a tablespoonful to be given every ten or fifteen minutes.

Sometimes combined with ipecacuanha.

More apt to act upon the bowels. Reason of this. Dose, of antimonial wine, f℥j to f℥ss. For children, gtt. x to xx; or graduated to the age.

ZINCI SULPHAS, *U. S.*

Sulphate of Zinc.

Before considered as an astringent. It is powerful, but safe, exciting speedy vomiting, but without occasioning the same amount of nausea as many of the other articles. The dose should be a decided one; otherwise, if retained, and not thrown off, it occasions nausea and distress. It should be recollected, in giving it, that too large a quantity will occasion irritation and inflammation; hence the necessity of caution in repeating the dose. The constitutional depression is less than that of tartar emetic, or ipecacuanha. Used in cases of narcotic poisoning, on account of its prompt action. Used in croup, not for an antiphlogistic impression, but to dislodge false membrane, and make an impression on the throat, fauces, and glottis. Dose, grs. x to xv.

CUPRI SULPHAS, *U. S.*

Sulphate of Copper.

Also a prompt and efficient cathartic, acting as the preceding. Dose, grs. x to xv.

The same caution is necessary as in the case of the Sulphate of Zinc.

Other salts of zinc and copper, as the *Acetates*, possess emetic properties. Also *Turpeth mineral;* but this is too harsh in its operation. *Alum* has been alluded to.

CATHARTICS.

THESE are substances which operate upon the bowels, producing an increase in the amount or frequency of the alvine evacuations.

Catharsis, *purgation*, and *purging*, are terms used to express the effect. *Purgatives* is a synonymous term with Cathartics, although the first expression was originally employed in a general sense for all substances which freed the system of peccant matter.

Arrangement of the alimentary canal with reference to purgatives, and the office of the liver and pancreas.

Cathartics operate either, 1. By acting on the muscular coat of the intestinal canal. 2. By increasing the discharge from the muciferous glands and exhalants, thereby augmenting the amount of fluid in the canal. Or, 3. By occasioning an increased flow of bile and pancreatic secretion. Effect of bile itself on the bowels, and office in primary assimilation.

Though cathartics may be divided with reference to these modes of acting, many of them combine all of these modes.

There is a difference as regards the portion of the alimentary canal to which cathartics may be directed. Thus, some impress the whole tube, others the lower portion; while others, again, the upper. This difference of direction cannot be explained by mere solubility; it is inherent to the article.

Cathartics are subdivided in accordance with the intensity of the effect, and the nature of the evacuation. Hence we have Laxatives, Purgatives, Drastics, Hydragogues, Cholagogues, &c. Explanation of the distinction.

The impression made, and the character of the evacuation, will depend not only upon the substance employed, but the quantity of it. In this respect, an article may belong to one or

other of the divisions mentioned. The condition of the alimentary canal will also modify the operation. Instances of this.

Cathartics not only produce a local impression, but they have a decided tendency to operate when in any manner conveyed into the system. Thus, by absorption or injection into the vessels, a similar purgative impression is made. There is no doubt that physical influences within the intestinal canal also are operative. Illustration from exosmose.

Difference between a mere irritant and a purgative.

Length of time required for their operation different.

Importance of correctly appreciating the length of time.

Primary effects. Secondary effects. Mode of impressing the circulation and absorption; and revulsive effects.

Relation between the bowels and skin, and between the bowels and kidneys.

They are given in various diseases to fulfil several indications.

1. *To unload the bowels.*—Advantage of such an effect. Evils of confined bowels to the system, and locally. Where an excited or inflammatory condition exists, there is a necessity of subduing it before they are employed. Bad effects of gaseous evolution. Diseases in which this indication must be carried out.

2. *To deplete.*—Most important, in consequence of this power, in febrile and inflammatory affections. Their mode of relieving the force of the circulation. Circumstances of the system in which proper. Superiority to more debilitating remedies in certain cases. Diseases in which beneficial. Danger of their use in Typhoid Fever. Kind of purgatives required to deplete.

3. *To revulse.*—Power to carry out this indication exemplified by reference to the extent of surface on which they operate. Diseases where this is advantageous.

4. *To promote secretion.*—Cathartics accomplish this in two ways: 1st. By cleansing the mucous surface. 2d. By exciting the secreting surfaces to a more healthy action. Advantages of this in the treatment of all diseases. Symptoms which under this indication demand their employment. These appertain to the state of the organs and the character of the stools.

Information imparted by inspecting the alvine evacuations. Normal and abnormal appearances of them.

Another mode of determining the state of the internal organs, and the necessity of cathartics, derived from the urine and the skin.

5. *To promote absorption.*—Mode of accomplishing this, and application.

6. *To act on contiguous viscera in the pelvis.*—Under this indication they come as Emmenagogues, where the uterus is the organ to be affected; but sometimes we desire to reach the genito-urinary organs. Illustration.

Many of these indications are simultaneously fulfilled in treating disease; and hardly a disease occurs in which but one is accomplished with advantage.

Abuse of cathartic medicines. State of the alimentry tube brought about by them when improperly used.

Contra-indications.

Advantages of combination.

Articles proper for administration to assist the operation of cathartics.

Mode of treating *Hypercatharsis.*

Laxative Articles of Food.—Bran bread; cracked wheat; corn meal; fruits.

Use and abuse of fruits; sugar; molasses.

VEGETABLE CATHARTICS.

TAMARINDUS, *U. S.*

Tamarind.

The preserved fruit of the *Tamarindus indica.*

Description of the plant. An inhabitant of the East and West Indies.

Fruit. Properties of the pulp; odor; taste.

Constituents, sugar and vegetable acids, extractive, &c.

Mode of preparing the fruit. Characters in this state.

A mild laxative. Taken as a refreshing drink.

Enters into the composition of *Confection of Senna* and *Confection of Cassia.*

Infusion of *Senna* and *Tamarinds.*

CASSIA FISTULA, *U.S.*

Purging Cassia.

The fruit of the *Cassia Fistula.* A native of the East and West Indies.

Description of the tree.

Structure; size; color and composition of the fruit; a *Legume.*

Pulp of purging Cassia.—Mode of preparing it.

Properties; color; consistence; odor; taste.

Effects of exposure and chemical changes.

Contains sugar, gum, extractive, and vegetable acids.

Medical Properties.—Mild laxative; used to preserve the bowels in a laxative state.

Inconveniences. Rarely given alone. Dose, ʒj—ij—ʒss.

It is an ingredient of the Confection of Senna. A *Confection of Cassia* is directed by some of the Pharmacopœias.

MANNA, *U.S.*

Manna.

The concrete juice of the *Ornus Europæa.* A native of Italy and Sicily. Called *Manna Ash.*

Description of the tree.

Mode of extracting and collecting *Manna.* Cause of diversity in the varieties.

Flake Manna.—Time at which obtained. Form and appearance; color; fracture; consistence; structure; odor; taste.

Manna in Sorts.—When collected. Of what materials constituted. Appearance and consistence.

Fat Manna.—Time when obtained from the tree, and characteristics.

Solubility of *Manna* in water and alcohol. Adulterations. Contains *Manna sugar* or *Mannite*, and a resin.

Difference between *Mannite* and sugar with respect to vinous fermentation.

Medical Properties.—Laxative and nutritive. By itself, apt to produce flatulence. Generally given in combination with senna, magnesia, &c. Aromatics, in combination, improve its operation. Dose, ʒss to j.

OLEUM RICINI, *U. S.*

Castor Oil.

The oil of the seeds of *Ricinus communis*. A plant probably tropical originally, but found to thrive in more temperate climates. Abundant in the south of Europe and the southern part of the United States. Called *Palma Christi.*

Description of the plant.

Form; color; appearance, and structure of the *Seeds.*

Modes of obtaining *Castor Oil.*

Properties; consistence; color; odor; taste. Solubility in alcohol and ether. Effects of age. Adulterations.

Saponifies with the alkalies.

Contains *Ricin-oleine, Ricino-stearine, acid resin.*

Medical Properties.—A mild effectual purge. Cases to which suited. Dose, f℥ss to j.

Mode of exhibition. Dose as a laxative, f℥j to ij.

Combination with alkalies. *Mistura Olei Ricini.* Advantages of this preparation.

RHEUM, *U. S.*

Rhubarb.

The root of *Rheum palmatum* and other species.

Description of the plant; also of *Rheum undulatum, Rheum compactum, Rheum australe, Rheum rhaponticum.* Localities of each plant.

Commercial varieties.

Russian Rhubarb.—Form and appearance of the pieces; size; partial perforation; external color; fracture; appearance of the surfaces; odor; taste; sensation to the teeth; cause of this; color of saliva. Powder. Effects of age. Source and quality.

Sometimes called *Turkey Rhubarb.* Explanation.

China Rhubarb.—Form of pieces; external appearance and color; complete perforation; solidity; fracture; appearance of the surfaces; odor; taste. Powder. Source; comparative value; adulteration; variety.

European Rhubarb.—Form of pieces; odor; fracture; internal structure; odor; taste. Points of difference from the preceding.

The first two varieties are derived from Central Asia, where they are held as a monopoly by a tribe of Tartars. The third variety is obtained by the cultivation of the same plants in England and on the Continent. It has been introduced into the United States. Remarks on cultivation.

Rhubarb contains an odoriferous principle, Rheic acid. *Rhabarbarin*, *Resins*, *tannin*, oxalate of lime.

Relation of rhubarb to water and alcohol.

Medical Properties.—These vary according to the dose; in full doses cathartic, in small doses astringent. Reason for this diversity. As a cathartic, it is mild, acting on the muscular coat. Character of the stools. Proofs of absorption. Cases to which adapted. Dose, ℈j to ʒj. Mode of administration. In certain cases objection to its use. Combinations. As a tonic and astringent dose, grs. ij to v. Effect of roasting.

INFUSUM RHEI, U.S.; *Infusion of Rhubarb.*—Mode of preparing. Employment. Dose, fʒss to fʒj.

TINCTURA RHEI, U. S.; *Tincture of Rhubarb.*—Ingredients. Stimulating and laxative. Uses. Dose, fʒj to fʒss.

TINCTURA RHEI ET SENNÆ, U.S.; *Tincture of Rhubarb and Senna.*—*Warner's Gout Cordial.* Ingredients. Cases to which adapted. Dose, fʒss.

TINCTURA RHEI ET ALOES; *Tincture of Rhubarb and Aloes.*—*Elixir Sacrum.* More active as a cathartic. Dose, fʒss. Uses.

TINCTURA RHEI ET GENTIANÆ; *Tincture of Rhubarb and Gentian.*—Ingredients. Laxative and tonic. Dose, fʒss.

SYRUPUS RHEI, U.S.; *Syrup of Rhubarb.*—Laxative dose, fʒj to fʒj.

SYRUPUS RHEI AROMATICUS, U.S.; *Aromatic Syrup of Rhubarb.*—Ingredients. An elegant preparation. Laxative and Cordial. Employment. Dose, fʒj to fʒss.

VINUM RHEI, U.S.; *Wine of Rhubarb.* Dose, fʒj to fʒss.

EXTRACTUM RHEI ALCOHOLICUM, U.S.; *Extract of Rhubarb.* Made with alcohol. Dose, grs. v to xx.

EXTRACTUM RHEI FLUIDUM, U.S.; *Fluid Extract of Rhubarb.*—Mode of preparation. Advantages. Dose, fʒj to ij.

PILULÆ RHEI, U.S.; *Rhubarb Pills.*—Mode of preparing.

Advantage of combination with soap. Employment. Dose, grs. x to xx.

PILULÆ RHEI COMPOSITÆ, U. S.; *Compound Rhubarb Pills.*—Ingredients. More active than the preceding, and at the same time tonic. Dose, grs. x to xx.

PULVIS RHEI COMPOSITUS, U. S.; *Compound Powder of Rhubarb.*—Composed of rhubarb, magnesia and ginger. Dose, ʒj to ij.

SENNA, *U. S.*

Senna.

The leaflets of *Cassia acutifolia*, *Cassia obovata*, and *Cassia elongata*.

Description of these plants. Place of growth, Egypt and Arabia.

Varieties of senna, *Alexandria*, *Tripoli*, and *India*.

Alexandria Senna.—Composed of the leaflets of the *C. acutifolia*, and *C. obovata*, with those of *Cynanchum oleifolium*, or argel. Properties of each. Place of growth in Upper Egypt. Mode of collecting, and route to market. Distinguishing character of senna leaflets. Color; odor; taste. Other admixtures.

Tripoli Senna.—Afforded by a variety of the acute-leaved cassia. Appearance. Value. Source from which procured.

India Senna.—Afforded by the *C. elongata*. Form of the leaflets; color and general appearance; form of pod. Place from which procured; mode of collecting, and route to the market. An elegant variety of India, known as *Tinnivelly*, and another of fine quality called *Mecca Senna*.

Relations of senna to water and alcohol.

Constituents, *Cathartin*, extractive, chlorophylle, &c.

Medical Properties.—One of the most energetic of the class; operating on the whole track of the alimentary canal; producing watery, feculent discharges. Cases to which adapted. Dose of powder, ʒss to ij; rarely given in this way.

INFUSUM SENNÆ, U. S.; *Infusion of Senna. Senna Tea.*—Ingredients, and mode of preparation. Necessity of excluding the atmosphere. Advantages of combination.

TINCTURA SENNÆ ET JALAPÆ; *Tincture of Senna and Jalap.*—

Ingredients. A form of *Elixir Salutis.* It is a warm, cordial purgative. Cases to which adapted. Dose, f℥ij to ℥ss.

CONFECTIO SENNÆ, U. S.; *Confection of Senna. Lenitive Electuary.*—Ingredients. Used in costiveness. Dose, f℥j to ij.

EXTRACTUM SENNÆ FLUIDUM, U.S.; *Fluid Extract of Senna.* ingredients. Mode of preparation. Advantages. Dose, f℥j to f℥ss.

CASSIA MARILANDICA, *U. S.*

American Senna.

The leaflets of the *Cassia Marilandica.* An indigenous plant. Description of it.

Size, form, color, odor, and taste of the leaflets.

It has the same medical properties as the exotic drug, and may be employed instead of it in somewhat larger doses.

JUGLANS, *U. S.*

Butternut.

The inner bark of the root of *Juglans cinerea*, or *White Walnut.* An indigenous plant.

Description of the tree.

Properties of the bark. Appearance; color; change by exposure; odor; taste.

Saccharine character of the sap.

From the bark a *decoction* is sometimes prepared; but the extract is usually employed; a saccharine extract is made from the sap.

EXTRACTUM JUGLANDIS, U. S.; *Extract of Butternut.*—Mode of preparing. Color; consistence; odor; taste. A thorough, but gentle cathartic; used alone or in combination. Dose, grs. x to xx, or more.

ALOE SOCOTRINA, *U. S.*

Socotrine Aloes.

ALOE CAPENSIS, *U. S.*

Cape Aloes.

ALOE BARBADENSIS, *U.S.*

Barbadoes Aloes.

The inspissated juice of the leaves of *Aloe Socotrina*, *Aloe Spicata*, *Aloe vulgaris*, and other species.

Description of these plants.

Modes of obtaining aloes. Varieties, *Socotrine*, *Cape*, *Barbadoes*, and *Hepatic Aloes*.

Socotrine.—From the *Aloe Socotrina*. Locality.

Properties; consistence; color; effect of age on color; fracture; transparency of edges; odor; taste; powder; quality; manner of packing it.

Cape Aloes.—From the *Aloe Spicata*. Locality. Called *Shining Aloes*.

Properties. Appearance; fracture; odor; taste; powder; quality.

Barbadoes Aloes.—From the *Aloe vulgaris*. Locality.

Properties. Form; color; odor; taste; powder; quality.

Hepatic Aloes.—Source; reason for the name.

Properties. Odor; taste; powder; quality; the inferior qualities called *Caballine Aloes*.

Relation of Aloes to water and alcohol.

Constituents. *Aloesin*, *Aloe Resin*.

Medical Properties.—A warm, stimulating purgative, having a direction to the lower portion of the alimentary canal. Character of stools. Length of time required for its operation. Absorbed. Effects of small doses roborant to stomach, and stimulating to the liver. Objection to the continued use of this drug.

Drastic action in large doses. Impression on pelvic viscera. Cases to which adapted. Dose, grs. x to xx. Combinations.

ALOE PURIFICATA, U.S.; *Purified Aloes.*—Made by dissolving in stronger alcohol and straining. It is freed from impurities.

TINCTURA ALOES, U.S.; *Tincture of Aloes.*—Ingredients and mode of preparing. Dose, f℥j to ℥ss. Employment.

TINCTURA ALOES ET MYRRHÆ, U.S.; *Tincture of Aloes and Myrrh. Elixir Proprietatis.*—Use as an emmenagogue. Dose, f℥j to ℥ss.

VINUM ALOES, U.S.; *Wine of Aloes.*—Ingredients. Used in dyspepsia. Dose, same as of Tinctures.

PILULÆ ALOES ET ASSAFŒTIDÆ, U.S.; *Pills of Aloes and Assafetida.*—Adapted to nervous cases with costiveness. Dose, grs. x to xx.

PILULÆ ALOES ET MASTICHES, *Pills of Aloes and Mastiche.* Laxative and stomachic. Dose, grs. v—x.

PILULÆ ALOES ET MYRRHÆ, U.S.; *Pills of Aloes and Myrrh.* —In chlorosis. Dose, grs. x to xx.

JALAPA, *U.S.*

Jalap.

The root of the *Exogonium Purga*, formerly *Ipomœa Jalapa.* A native of Mexico.

Description of plant. Historical sketch.

Properties of the root; form, color, and external aspect; internal structure, and color; consistence; fracture; odor; taste. Mode of preparing. Powder. Effects of age.

Adulteration.

Contains *resin*, starch, gum, &c.

Relations to water and alcohol.

Medical Properties.—A certain and powerful cathartic.

Character of stools. Employment. Dose, grs. x to xx.

Combinations.

RESINA JALAPÆ, U.S.; *Resin of Jalap.*—Mode of procuring. Form; color; fracture; odor; taste; effect of heating it; solubility in alcohol; insolubility in ether. *Jalapine.*

EXTRACTUM JALAPÆ, U.S.; *Extract of Jalap.*—Mode of preparing.

Constituents. Dose, grs. x to xv. Enters into Compound Cathartic Pills.

TINCTURE JALAPÆ, U.S.; *Tincture of Jalap.*—An alcoholic solution of the resin; a harsh cathartic alone, but may be used in combination. Dose, f℥j to ij.

PULVIS JALAPÆ COMPOSITA, U.S.; *Compound powder of Jalap.*—Ingredients. Used for continual purging. Dose, ℥ss to j.

PODOPHYLLUM, *U.S.*

Mayapple.

The rhizoma of the *Podophyllum peltatum.* An indigenous plant.

Description of the plant. Localities. Time of flowering, &c.

Properties of the root. Form; size; color; fracture; odor; taste; powder.

Contains a peculiar principle, *Podophyllin.*

Medical Properties.—An active hydragogue cathartic, resembling jalap. Dose, grs. x to xv. Combinations.

EXTRACTUM PODOPHYLLI, U. S.; *Extract of Mayapple.*—The mode of preparation same as that of Ext. Jalapæ. Dose, grs. v to x.

RESINA PODOPHYLLI, U. S.; *Resin of Mayapple.*—Mode of preparing. Uses. Dose, gr. ½—j.

SCAMMONIUM, *U.S.*

Scammony.

The concrete juice of the root of *Convolvulus Scammonia.*

A native of Asia Minor.

Description of the plant.

Mode of procuring and preparing the juice.

The purest kind called *Virgin scammony.*

Properties of *Virgin scammony.* Form; external covering; friability; appearance of fractured surface; color; effect of moistening; odor; taste; reaction with an acid.

Other qualities manufactured; mode of preparing them; ingredients employed; varieties designated by the existence of chalk, or starch in them, as *Calcareous, Amylaceous, Calcareo-Amylaceous.*

Form; color; physical and chemical characters of these varieties. The place from which they come is Smyrna. Also still more adulterated articles noticed. Best kind of scammony formerly called Aleppo; but this designation is not applied to it at present.

The constituents of good scammony are gum and *resin.*

In the virgin, the resin amounts to 70 or 80 per cent., but less in the adulterated.

Factitious Scammony, from the *Cynanchum Monspeliacum*.

Characteristics.

Medical Properties.—A powerful drastic cathartic, usually given in combination. Dose, grs. x to xx.

Administration in pill or emulsion. Employment. Enters into the Compound Extract of Colocynth.

RESINA SCAMMONII, U.S.; *Resin of Scammony.*—Mode of preparation.

COLOCYNTHIS, *U.S.*

Colocynth.

The fruit of the *Citrullus Colocynthis*. A native of Syria, India, and Northern Africa.

Description of the plant.

Fruit. Form; color; structure; portion employed; odor; taste. Seeds.

Constituents, a peculiar principle, *colocynthin*, resin, and extractive.

Medical Properties.—In moderate doses, laxative; in larger doses, a drastic cathartic, even acting deleteriously. Dose of powder, grs. v to x; but rarely given in this form. Advantages of combination.

EXTRACTUM COLOCYNTHIDIS ALCOHOLICUM, U.S.; *Alcoholic Extract of Colocynth.*—Mode of preparing. Characters. Use.

EXTRACTUM COLOCYNTHIDIS COMPOSITUM, U.S.; *Compound Extract of Colocynth.*—Ingredients, and mode of preparation.

Properties. One of the most useful of purgative preparations. Combination with mercurials and narcotic extracts.

Dose, grs. v to xv. Cases to which applicable. Enters into the *Compound Cathartic Pills.*

GAMBOGIA, *U.S.*

Gamboge.

The concrete juice of an uncertain tree. Probably a species of *Garcinia* or *Hebradendron*.

Description of *Hebradendron Cambogioides*. A native of Ceylon.

The officinal Gamboge comes from Siam.

Pipe Gamboge.—Form; mode of collection; external appearance and color; fracture; effect of moistening; odor; taste; Powder.

Gamboge in sorts.—Form; appearance; quality.

Relation to water and alcohol.

Constituents.—Gum and resin.

Medical Properties.—A powerful drastic hydragogue cathartic, sometimes acting with violence. Dose, grs. ij to iv, in pill. Generally given in combination. Cases to which adapted.

PILULÆ CATHARTICÆ COMPOSITÆ, U. S.; *Compound Cathartic Pills.*—Ingredients. Cases to which suited. Dose, 2 to 4 pills.

ELATERIUM, *U. S.*

Elaterium.

A substance deposited by the juice of the fruit of the *Momordica Elaterium*.

Description of the plant. A native of the South of Europe. Cultivated in England. Called wild, or squirting cucumber.

Clutterbuck's Elaterium.—Mode of procuring it. Proportion obtained. Activity.

Commercial of two kinds.—*White* and *Black*.

White Elaterium.—Mode of procuring; form; appearance; color; fracture; odor; taste. Relation to water and alcohol.

Black Elaterium.—Mode of preparing; form; color; quality.

Constituent of Elaterium a peculiar principle, *Elaterin*.

Medical Properties.—An energetic hydragogue cathartic. Irritating in large quantity. Employment. Dose, gr. $\frac{1}{8}$—$\frac{1}{6}$—$\frac{1}{4}$.

Effects of over-doses. Dose of elaterin, gr. $\frac{1}{12}$—$\frac{1}{8}$. Caution in the use of Elaterium.

OLEUM TIGLII, *U. S.*

Croton Oil.

The oil of the seed of the *Croton Tiglium*. A native of India.

Description of plant. Seeds. Mode of obtaining the oil.

Properties of the oil. Consistence; color; odor; taste.

Adulteration.

Contains a principle called *Tiglin.*

Medical Properties.—A powerful hydragogue; in moderate doses, acting with ease; in too great a dose, acting on stomach, and inordinately purging. Dose, gtt. j to ij. Mode of administration. Advantages. Cases to which applicable.

Irritant properties when applied to the skin. Purpose of application.

HELLEBORUS NIGER, *U. S.*

Black Hellebore.

The root of the *Helleborus Niger*, a plant growing in the mountainous regions of Europe.

Description of plant.

Properties of the root; form; color; fracture; odor; taste. Difference between it and the root of *Actæa spicata.*

Constituents, volatile oil, and resinous extractive. *Helleborin.*

Medical Properties.—Harsh drastic cathartic. Danger of overdoses. Employment. Determination to the pelvic viscera. Dose, grs. x; or in smaller doses as a nervous stimulant and diuretic.

EXTRACTUM HELLEBORI ALCOHOLICUM, U. S.; *Extract of Black Hellebore.*—Mode of preparation. Dose, grs. iij to v.

TINCTURA HELLEBORI, U. S.; *Tincture of Black Hellebore.*—Uses. Dose, gtt. x to ʒj.

MINERAL CATHARTICS.

SULPHUR SUBLIMATUM, *U. S.*

Sulphur.

Sublimed Sulphur. Flowers of Sulphur.—Chemical nature; source. *Sulphur in rolls* called *Brimstone.*

SULPHUR LOTUM, U. S.; *Washed Sulphur.*—Properties; form; color; odor; taste. Effects of heat. Insolubility in water and alcohol, but soluble in some volatile and fixed oils.

SULPHUR PRÆCIPITATUM, U.S.; *Precipitated Sulphur. Lac Sulphuris.*—Mode of preparation. Characteristics.

Medical Properties.—Laxative; mode of action and of absorption. Effects upon the secretions. Employed as a cathartic; in skin and other affections, as an alterative. Dose, ʒj to ij.

Mode of administration. Less quantity given as an alterative; and repeated.

External application.

UNGUENTUM SULPHURIS, U.S.; *Sulphur Ointment.*—Preparation. Employment.

Employment by fumigation.

Remarks on *Sulphur Waters.*

SULPHURIS IODIDUM, U.S.; *Iodide of Sulphur.*—Mode of preparation. Characters. Used in skin diseases.

UNGUENTUM SULPHURIS IODIDI, U.S.; *Ointment of Iodide of Sulphur.*—Strength, grs. 30 to a troy ounce of lard.

MAGNESIÆ CARBONAS, *U.S.*

Carbonate of Magnesia.

Mode of obtaining it. Rationale.

Form; color; weight; feel; taste. Solubility in acids. Impurities.

Medical Properties.—Laxative and antacid. Cases to which applicable. Combinations. Dose, ʒj to ij.

MAGNESIA, *U.S.*

Magnesia.

Improperly *Magnesia Usta.* Mode of preparing. Rationale.

Form; color; odor; taste. Solubility in water. Chemical nature.

Heavy Magnesia.—Difference between it and ordinary calcined.

Medical Properties.—Laxative and antacid; can be made decidedly purgative. Liable to accumulation; remedy. Cases to which applicable. Dose, ʒj.

Combinations.

TROCHISCI MAGNESIÆ, U.S.—Mode of preparing. Uses.

LIQUOR MAGNESIÆ CITRATIS, *U. S.*

Solution of Citrate of Magnesia.

Mode of preparation. Color and taste of the solution. Efficiency as a cathartic. Advantages in the cases of children. Dose, f℥ij—iv—viij.

MAGNESIÆ SULPHAS, *U. S.*

Sulphate of Magnesia.

Epsom Salts. Why so called.

Mode of procuring it from sea water.

Form, color, and appearance of the crystals. Effect of exposure; taste; solubility.

Chemical nature.

Medical Properties.—An efficient, mild, hydragogue cathartic, adapted to febrile complaints. Dose, ℥j.

Mode of administration. Combinations.

SODÆ SULPHAS, *U. S.*

Sulphate of Soda.

Glauber Salts. Found deposited on the bottoms of certain lakes; also prepared artificially.

Mode of preparation. Rationale. Chemical nature.

Form; transparency; effects of exposure; taste; solubility.

Medical Properties.—An active saline cathartic. Character of the stools. Dose, ℥ss to j.

SODÆ PHOSPHAS, *U. S.*

Phosphate of Soda.

Mode of preparation. Rationale.

Form and color of the crystals. Effect of exposure. Solubility; taste.

Medical Properties.—A mild saline cathartic, sometimes preferred on account of its taste. Dose, ℥j. Mode of administration.

POTASSÆ SULPHAS, *U. S.*

Sulphate of Potassa.

Vitriolated Tartar.—Mode of obtaining it. Rationale.

Chemical nature.

Form, appearance, and color of the crystals. Hardness; solubility; taste.

Medical Properties.—A mild cathartic, but objected to on account of its insolubility. Cases in which used. Dose, ʒss to j. Use in Dover's powder.

POTASSÆ BITARTRAS.

Bitartrate of Potassa.

Cream of Tartar.—Mode of obtaining it.

Chemical nature.

Form; color; solubility; taste.

Crude forms of it.

Medical Properties.—More laxative and refrigerant than purgative. Used in febrile affections. Dose, ʒij to ʒss. Mode of administration. Combinations.

POTASSÆ TARTRAS, *U. S.*

Tartrate of Potassa.

Soluble Tartar.—Mode of preparing. Rationale.

Form; solubility; effect of exposure; taste.

Medical Properties.—Mild cathartic. More used as a diuretic. Dose, ʒss to j. May be added to the *Senna Draught.*

POTASSÆ ET SODÆ TARTRAS, *U. S.*

Tartrate of Potassa and Soda.

Rochelle Salt.—Mode of preparing. Rationale and chemical composition.

Form and shape of its crystals; color; taste; effects of heat; solubility.

Medical Properties.—Mild. Dose, ʒj.

PULVERES EFFERVESCENTES APERIENTES, U.S.; *Aperient Effervescing Powders.*

Seidlitz Powders.—Ingredients and proportions of them.

Cases to which adapted.

HYDRARGYRI CHLORIDUM MITE, *U. S.*

Calomel.

This preparation, already treated of under the head of Alteratives, is here presented as a *Cathartic.*

Mode of acting by impressing the liver, as well as promoting the secretions. Peculiarities of its action. Inconveniences, and necessity of assistance from other purgatives. Time at which best administered. Dose, grs. v to x, followed up by other cathartics. Articles most suitable for this purpose. Character of the stools.

The degree of impression not in proportion to the quantity taken. Reason for this. Danger of salivation from retention in the bowels. Danger to individuals in whom the chlorides are in excess, as seamen. Reaction of common salt with calomel. Reason for its nauseant action upon the stomach.

Employed in cases of children, and adapted to their diseases. Rarely produces salivation. More searching in its action, when employed in small repeated doses of gr. $\frac{1}{2}$ to j, until grs. v or more be taken.

Cases in which given advantageously.

Full purgative dose for children, grs. ij to iv.

Calomel is an ingredient of the *Compound Cathartic Pills.*

ENEMATA.

This method of medication has already been treated of (*see* p. 25). To facilitate the action of Cathartic Medicines, or simply to open the bowels, we may employ tepid water, flaxseed tea, or an infusion of elm bark, barley water, or the

Common Enema.—Mode of preparing and using this.

If a more active impression is desirable, a solution of salts, ℥ij to Oj water. Senna tea or castor oil, added to the common injection, may be administered. Mode of treating colic by these means.

Where flatulence exists, and is the cause of distress and inconvenience, the *Oil of Turpentine* may be added to a simple solution of gummy matter: f℥ss of the oil may be given in this way, or f℥ij to iv of *Lac Assafœtidæ.*

Advantages of using the *Milk of Assafetida* in the cases of children; the dose proportioned to the age.

DIURETICS.

THESE are medicines which occasion increased action of the kidneys, and promote the urinary secretion.

The function of the kidneys influenced by the condition of the system generally, and by the state of derangement in other organs. Hence, the idea that no such class exists. Diuretic operation admitted to depend upon an impression made upon the general system and the organs. Explanation of this view by reference to the state of the circulatory system, whether depressed or elevated. Remedies affecting the circulatory system will prove diuretic by augmenting or lowering its force.

The state of the stomach will influence diuresis, and remedies which are directed to it may also indirectly influence the kidneys. These are *indirect means.*

But there are also *direct means*, and they are substances which enter the *circulation*, and act upon the kidneys.

The evidence of a special action upon the kidneys deduced from the preference of operation upon these organs and their detection in the urine. Instances of this. Their action also may be inordinate and productive of lesion.

Relation of the kidneys to the skin. Proof of this relation. Practical application of this fact in promoting the action of diuretics.

Antagonism of the bowels, and the necessity of avoiding direct purgatives during the operation of a diuretic.

But diaphoretics and purgatives are capable of assisting in the action of diuretics, by preparing the bloodvessels and system for their introduction by absorption.

Necessity of articles of this class being in solution.

Relation of the specific gravity of the solution to the specific

gravity of the liquor sanguinis. Explanation upon this ground of the fact that the same article is purgative and diuretic.

Administration of drinks. Temperature of them. Water necessary for diuresis.

The *indications* for their use are:—

1. *To promote and keep up the action of the kidneys.*—Importance in febrile and inflammatory complaints. Depurative effects in such complaints; and the evils from retained effete matters.

2. *As depletory and revulsive remedies.*—Some advantage derived from this in affections of excitement. Cases.

3. *To evacuate fluid.*—The indication in dropsies. Liability to uncertainty. Reasons for this, and mode of obviating it.

4. *To soothe and diminish irritation of the urino-genital organs.*—Cases where this is expedient.

5. *To act locally by stimulation on the mucous surfaces of the urino-genital organs.*—Cases in point.

6. *To alter or modify the nature of the urinary secretion.*—Employment under this head. Here designated as *Lithontriptics.*

SCILLA, *U. S.*

Squill.

The bulb of the *Scilla Maritima.*

Description of the plant. A native of the shores of the Mediterranean, Spain, Italy, Sicily, and the Levant.

Form, size, structure, odor, and taste of the fresh bulb; varieties; preparation for market; parts rejected; amount of water, and effects of drying.

White Squill.—Form of pieces; color; size; texture; fracture; taste; effect of exposure. Powder.

Red Squill.—Color and difference. Powder.

Relation to water, alcohol, vinegar.

Constituents, volatile matter, and *scillitin.*

Medical Properties.—Squill has been mentioned as a harsh emetic. Poisonous effects. It has stimulating diuretic properties. Cases to which adapted, and the condition of the system required.

Importance of commencing with small doses, as gr. $\frac{1}{2}$, three

or four times daily. Generally given in combination. Reason for this. Articles with which combined. Administration.

ACETUM SCILLÆ; *Vinegar of Squill.*—Mode of preparation. Dose, gtt. xx to xxx.

TINCTURA SCILLÆ, U.S.; *Tincture of Squills.*—Mode of preparation. Dose, gtt. x to xxx.

COLCHICI RADIX, *U.S.*

Colchicum Root.

The cormus of *Colchicum Autumnale.*

COLCHICI SEMEN.

Colchicum Seed.

The seeds of the *Colchicum autumnale.*

Meadow Saffron.—A native of England and the Continent of Europe.

Description of the plant, and its peculiar physiology.

Time at which the root is collected.

Form; structure; color; external appearance; *process-like formation;* odor and taste of the fresh root; manner of preparing it for the market; causes of inequality as a medicine.

Shape, structure, fracture, odor, and taste of the *Commercial Colchicum Root.*

Form, color, size, structure, odor, and taste of the *seeds.*

Both root and seeds contain a peculiar principle—*Colchicina.* A large quantity of starch in the root.

Medical Properties.—The properties investigated in modern times. Effects upon the kidneys; upon the skin; nervous system and bowels. Inordinate impression. Cases of dropsy to which applicable. Condition of the system necessary for its beneficial impression in gout and rheumatism. Evil effects of mal-administration. Mode of operation.

Dose in substance, gr. j to iij, made into pill.

ACETUM COLCHICI, U.S.; *Vinegar of Colchicum.*—Mode of preparing. Dose, gtt. xx.

VINUM COLCHICI RADICIS, U.S.; *Wine of Colchicum Root.*—Mode of preparation. Strength. Necessity of filtering and separating the sediment. Dose, gtt. x to xx.

VINUM COLCHICI SEMINIS, U.S.; *Wine of Colchicum Seed.*—Mode of preparing. Dose, gtt. x to f3j.

TINCTURA COLCHICI SEMINIS, U.S.; *Tincture of Colchicum Seed.*—Mode of preparing. Dose, gtt. x to f3j.

EXTRACTUM COLCHICI ACETICUM, U.S.; *Acetic Extract of Colchicum.*—Made from the root. Mode of preparing. Dose, gr. j to ij, repeated three or four times a day.

EXTRACTUM COLCHICI RADICIS FLUIDUM, U.S.; *Fluid Extract of Colchicum Root.*—Mode of preparation. Dose, gtt. v to x.

EXTRACTUM COLCHICI SEMINIS FLUIDUM, U.S.; *Fluid Extract of Colchicum Seed.*—Dose, gtt. v—x.

Remarks on the combination of narcotic and purgative medicines with colchicum. The magnesia, or *Scudamore's Mixture.*

DIGITALIS, *U.S.*

Foxglove.

Before spoken of as a nervous sedative; now to be considered as a *Diuretic;* peculiarity of its action. Mode of operating. Peculiar cases to which adapted. Administration and precautions as before specified.

Remarks on the TEREBINTHINATES.

TEREBINTHINA, *U.S.*

Turpentine.

The juice of *Pinus palustris*, and other species of pines, more especially inhabiting the southern States.

Description of plants.

Mode of obtaining turpentine.

Sometimes called *White Turpentine.* Localities from which obtained; consistence; color when fresh; change from exposure; odor; taste; effect of heat upon it.

Constituents, resin and volatile oil. Proportion of oil.

Relation to water and alcohol.

TEREBINTHINA CANADENSIS, *U.S.*

Canada Turpentine.

The juice of the *Abies Balsamea.* A native of the colder regions of the United States and Canada.

Description of the tree. Mode of obtaining the turpentine. Called *Canada Balsam. Balsam of Fir.*

Consistence when first collected; color; transparency; odor; taste; effect of age and exposure; proportion of volatile oil; inflammability.

OLEUM TEREBINTHINÆ, U. S.; *Oil of Turpentine.*—The mode of obtaining this principle from white turpentine, and its properties and chemical nature, have been presented under the head of Arterial Stimulants; it is here to be considered as a *Diuretic.* It is the efficient principle in the turpentines which have been noticed.

Medical Properties.—The turpentines are stimulating diuretics. Odor communicated to the urine. Cases of disease in which they are serviceable. Effects of too free exhibition. The dose of white turpentine, grs. x to xxx, in pill repeated; of the Canada balsam, grs. x to xx, in pill or emulsion; of the oil, gtt. x to xx, three or four times in the day.

PIX LIQUIDA, *U. S.*

Tar.

The impure turpentine procured by burning from the wood of *Pinus palustris* and other species of pinus.

Mode of obtaining tar. Sources same as of turpentine.

Properties; consistence; color; odor; taste; solubility in water.

A very compound substance; among the constituents, are pyrogenous resins and oils, acetic acid, creasote.

By long boiling the more fluid parts escape, and there remains *Pitch—Pix nigra.*

Medical Properties.—Like the turpentines, a stimulating diuretic, but acts also as an expectorant. It is used as an external stimulating application in skin affections. Cases in which used; tar itself seldom given. Dose, f℥ss to f℥j, made into pills. The water in which it has been digested, called *Infusum Picis Liquidæ*, U. S., *Tar water,* most employed. Mode of preparing it. Principles on which the virtues depend. Dose, f℥ij, repeated. A pint may be taken daily.

UNGUENTUM PICIS LIQUIDÆ, U. S.; *Tar Ointment.*—Mode of preparing. Cases to which applicable.

CREASOTUM, U.S.; *Creasote.*—Mode of preparing.

Properties; consistence; color; odor; taste; effect of age; sp. gr. 1.837. High boiling, and low freezing point; volatility; inflammability; solubility in water and alcohol; origin of name.

Medical Properties.—A stimulant and coagulant in the pure state; diluted, it enters the circulation, acting on the kidneys; but most used as a hæmostatic agent; effect on albumen. Also used as a detergent and antiseptic in foul and gangrenous ulcers; other applications. Dose, gtt. j to ij, properly diluted, or in pill.

AQUA CREASOTI, U.S.; *Creasote Water.*—Strength. Use as a lotion.

UNGUENTUM CREASOTI, U.S.; *Ointment of Creasote.*—Preparation. Uses.

RESINA, U.S.; *Resin.*—The residuum after the distillation of the volatile oil from white turpentine. In common language *Rosin.*

Properties; solubility; color; fracture; odor; taste; effect of heat; product of burning; solubility in alcohol; effect of the alkalies in rendering it soluble in water. Chemical constitution. Union with oils.

By melting and incorporating water, *Resin* becomes *White Resin.*

Employment of *Resin* to form ointments and plasters.

CERATUM RESINÆ, U.S.; *Resin Cerate, Basilicon Ointment.*—Mode of preparation. Uses.

EMPLASTRUM RESINÆ, U.S.; *Resin Plaster, Adhesive Plaster.*—Mode of preparation and uses.

COPAIBA, *U.S.*

Copaiba.

The juice of *Copaifera officinalis* and other species of *Copaifera.* Natives of Brazil.

Mode of obtaining the juice. Improperly called *Balsam* of *Copaiba.* Reason.

Properties; consistence; color; odor; taste. Effects of age upon it. Relation to water and alcohol.

Action of alkaline substances upon it.

Adulterations.

Constituents, acid resin called *Copaivic acid*, *Volatile oil.*

Medical Properties.—A stimulating diuretic, giving to the urine a peculiar odor; acting also on the mucous membranes; generally employed in affections of kidneys, bladder, and urethra. Also in those of alimentary canal or lungs. Effects on the skin. Dose, gtt. x to xxx, three times daily. Given in emulsion—caution in preparing it; or in Capsules.

OLEUM COPAIBÆ, U.S.; *Oil of Copaiba.*—Mode of procuring it; properties; chemical nature; employment; mode of administration. Dose, gtt. v to x.

PILULÆ COPAIBÆ, U.S.; *Copaiba Pills.*—Mode of preparation. Chemical nature. Advantages of the magnesia. Combining proportion. Dose, grs. x to xx.

JUNIPERUS, *U.S.*

Juniper.

The fruit of the *Juniperus communis.* A native of Europe, but abundant in this country.

Description of plant.

Properties of berries; size; color; odor; taste; relation to water and alcohol.

Medical constituent, volatile oil.

Medical Properties.—Stimulating diuretic. Adapted to cases free from excitement. Usually directed in combination. Articles with which combined.

INFUSUM JUNIPERI, U.S.; *Infusion of Juniper.*—Mode of preparing it. Dose, f℥ij to iv. One pint may be taken in 24 hours.

OLEUM JUNIPERI, U.S.; *Oil of Juniper.*—Mode of obtaining it. Consistence; color; odor; taste; effects of age; chemical character. Dose, gtt. v to x. Administration.

SPIRITUS JUNIPERI COMPOSITUS; *Compound Spirit of Juniper.*—Ingredients. Cordial, stimulating, and diuretic. Dose, f℥j.

Remedial effect of Hollands.

TARAXACUM, *U.S.*

Dandelion.

The root of the *Leontodon taraxacum.* Native of Europe and this country.

Description of plant.

Properties of the root; size; color; formation; fracture; odor; taste. Preference given to the fresh root.

Constituents, bitter extractive, sugar, gum.

Medical Properties.—Diuretic, laxative, and acting on the liver. Cases to which adapted.

INFUSUM TARAXACI, U.S.; *Infusion of Dandelion.*—Mode of preparing. Dose, f℥ij to iv. Combinations. Employment.

EXTRACTUM TARAXACI, U.S.; *Extract of Dandelion.*—From fresh root. Mode of preparing; appearance; consistence; odor; taste. Dose, grs. x to xx, three times daily. Administration. Combinations.

EXTRACTUM TARAXACI FLUIDUM, U.S.; *Fluid Extract of Taraxacum.*—Mode of preparing. Dose, f℥j.

BUCHU, *U.S.*

Buchu.

The leaves of *Barosma crenata* and other species. Plants growing at Cape of Good Hope.

Description.

Leaves used. Characters. Sensible properties.

Constituents, volatile oil and extractive.

Menstrua.

Medical Properties.—Cases to which applicable.

INFUSUM BUCHU, U.S.; *Infusion of Buchu.*—Mode of preparation. Dose, f℥j to ij.

EXTRACTUM BUCHU FLUIDUM, U.S.; *Fluid Extract of Buchu.*—Made with alcohol. Dose, f℥j.

PAREIRA, *U.S.*

Pareira Brava.

Root of the *Cissampelos pareira.* A native of South America and the West Indies.

Description of the plant.

Characters of the root; inodorous; taste.

Constituents, *Cissampelina*, resin, bitter principle.

Menstrua.

INFUSUM PAREIRÆ; *Infusion of Pareira Brava.*—Dose, f℥ij.

Medical Properties.—Cases of irritable bladder treated with it. Given in decoction, infusion, and extract.

APOCYNUM CANNABINUM, *U.S.*

Indian Hemp.

The root of the *Apocynum cannabinum*, an indigenous plant.

Description of the plant.

Properties of the root; size; structure; color; odor; taste. Contains an acrid oleoresin.

Medical Properties.—An active diuretic, emetic, or purgative. Given in decoction made by boiling ℥ss of root in Ojss water to a pint. Dose, f℥j to ij, two or three times daily.

ERIGERON, *U.S.*

Fleabane.

The herbaceous portions of *Erigeron Heterophyllum and Erigeron Philadelphicum*, which are indigenous.

Description of the plants.

Sensible properties. Relation to water.

Contains a volatile oil.

Medical effect, mildly diuretic. Cases to which applicable. Given in decoction ℥j to Oj water, drunk *ad libitum*.

CAROTA, *U.S.*

Wild Carrot.

The seeds of the *Daucus carota*, an indigenous plant. Description of it.

Properties of the seeds; form; size; color; odor; taste; relation to water. Flowering tops.

Active ingredient volatile oil.

Medical Properties.—A mild, stimulating diuretic, also somewhat cordial. Cases to which adapted. Given in infusion, ℥ss to Oj water. Dose, f℥ij to iv. Used as an adjuvant.

Root of the cultivated carrot. Esculent and medicinal properties. External employment.

PETROSELINUM, *U. S.*

Parsley Root.

The root of the *Apium petroselinum*. Cultivated.

Medical Properties.—A moderately stimulating diuretic. Given in infusion. Cases to which applicable. Adjuvants.

CANTHARIS, *U. S.*

Cantharides.

Spanish Flies. Cantharis vesicatoria.—For the natural history and chemical constitution, &c., of this insect, see *Epispastics.*

Medical Properties.—Diuretic. Inordinate impression from over-doses. Poisonous effect. Cases to which applicable. Caution in the administration. Reputation as an emmenagogue. Dose, gr. j, three times daily, in pill.

TINCTURA CANTHARIDIS, U. S.; *Tincture of Spanish Flies.*—Mode of preparing. Dose, gtt. v to x, repeated three times daily. Desist from exhibition when it occasions strangury. Employment.

POTASSÆ CARBONAS, *U. S.*

Carbonate of Potassa.

Modes of obtaining and preparing it for employment. Rationale.

Called *Salt of Tartar.*

Form; color; taste; effect of exposure; solubility in water; insolubility in alcohol. Action of acids. Impurities. Chemical character.

Medical Properties.—Antacid, diuretic, and antilithic.

Effect on fats in the stomach. Change produced in the urine.

Effects of long exhibition on the blood, and injurious action of too large doses. Employment. Dose, grs. x to xx, two or three times a day. Mode of administration.

POTASSÆ BICARBONAS, *U. S.*

Bicarbonate of Potassa.

Method of preparing.

Form; color of crystals; taste; solubility. Change in hot solution and from heat.

Chemical character.

Medical Properties.—Similar to the carbonate. Employment. Advantages. Dose, ʒss to ʒj. Combinations.

POTASSÆ ACETAS, *U. S.*

Acetate of Potassa.

Called *Sal Diureticus.*

Mode of preparing.

Form; color; taste; effect of exposure. Solubility.

Medical Properties.—Diuretic; change in the urine. Employment. Dose, ℈j to ʒj. Administration.

POTASSÆ BITARTRAS, *U. S.*

Bitartrate of Potassa.

Mentioned under Cathartics. More sparingly exhibited and very much diluted with water, an efficient diuretic.

Mode of administration. Combinations. Dose, ℥ss in Oj of water, drank during the 24 hours.

Change produced in the urine. Cases to which adapted.

POTASSÆ NITRAS, *U. S.*

Nitrate of Potassa.

Spoken of as an arterial sedative. A decided diuretic, calculated to meet this object in cases of excitement. Dose, grs. x, every two, three, or four hours. Apt to weaken and depress, if not irritate the stomach.

SPIRITUS ÆTHERIS NITROSI, *U. S.*

Spirit of Nitrous Ether.

Sometimes called *Spiritus Nitri Dulcis*, Sweet Spirits of Nitre.

Mode of preparing it. Rationale.

Composition.

Properties; limpidity; color; odor; taste; inflammability; volatility. Sp. gr. 0.887. Effect of age.

Adulteration.

Medical Properties.—Diuretic, diaphoretic, and antispasmodic. General application. Advantages in cases of children. Mode of administration. Dose, f℥ss to j. Combinations.

DIAPHORETICS.

By this term are designated medicines which produce or facilitate the discharge from the skin. When moderate, this discharge is *perspiration;* when profuse, it constitutes *sweat.*

A distinction has been drawn between *Diaphoretics* and *Sudorifics.* This, however, is not necessary, as the same substance may be one or the other, the moderate or inordinate impression being dependent upon a number of contingent circumstances; the discharge is also the same, whether moderate or profuse; and further, the most opposite impressions may be productive of the same effects. The two names may be used synonymously.

The skin exhales salts and animalized matter derived from the blood. Chloride of sodium is one of the salts.

Under ordinary circumstances, the cutaneous transpiration is *insensible,* because removed by the atmosphere; if the amount be increased to such an extent that it cannot be removed, it remains upon the skin, and becomes *sensible.*

Proofs, from an experiment, that exhalation takes place.

There is another reason why perspiration becomes sensible, which is the hygrometric condition of the atmosphere; if the air is humid and non-absorbent, the insensible perspiration will not be removed as fast as formed, and, remaining on the skin, will constitute sweat. This is an element always to be taken into consideration in determining the amount of perspiration.

From the clogged condition of the skin under a humid atmosphere, there may be an actual diminution of perspiration, while there is a greater show of it.

The amount of perspiration is modified by the vigor of the system, by the nature and quantity of the ingesta, and the temperature of the atmosphere.

Perspiration may be promoted by diminished pressure of the atmosphere, and by exercise.

Perspiration is effected by two acts: one merely physical, whereby water is exhaled; the other, secretory. The exhalation of water preserves the natural temperature of the skin; while the secretory act contributes to the removal of materials which, by retention, would prove injurious.

Explanation of the antagonism between the skin and the kidneys, and of the relation between the skin and the bowels and lungs.

Diaphoretics produce their effects in opposite ways:—

1. *By relaxing the skin.*—Illustration of this mode.

2. *By stimulating the circulation.*—Explanation of the conditions in which this is the case.

3. *By entering the circulation, and acting directly on the skin.*—Instances given where this is probably the fact. Proofs of substances reaching the skin. Many, however, which are taken up by the circulation, produce diaphoresis by acting on the general system.

4. *By producing an impression upon the stomach, which is communicated to the skin.*—Illustration.

5. *By filling the bloodvessels.*—Illustration and proof.

Diaphoretics are relative agents; and, since a number of circumstances are to be taken into consideration to produce their effects, many adventitious agents are to be employed in promoting them. Illustration of this from the time of administration; the management of covering, and the use of drinks. The indications they are capable of fulfiling are:—

1. *To promote the subsidence of disease, which usually terminates by perspiration.*—Illustration of this derived from their use in fevers, &c.

2. *To deplete.*—Extent to which this can be carried. Advantage in cases of excitement or plethora.

3. *To produce revulsion by determination to the surface.*—Illustration of relief to the internal organs from this cause. Cases to which this applies. Modes of favoring it.

4. *To promote absorption.*—Explanation of the manner in which this is effected. Advantageous in cases of dropsy.

5. *To eliminate noxious matter from the system.*—Illustration of the depurative action of the skin, and propriety of employing it; but caution against the abuse of this indication in acute diseases by forced measures.

Free natural perspiration very different from colliquative sweat sometimes met with in disease. The one to be promoted, the other checked. The measures indicated to check profuse diaphoresis.

Diaphoretics may be divided into *Nauseating*, *Refrigerant*, and *Alterative*.

NAUSEATING DIAPHORETICS.

IPECACUANHA, *U. S.*

This article has been treated of under the head of Emetics. It is seldom employed as a diaphoretic by itself, but usually in combination with opium.

Employed in the treatment of fevers and inflammations. If slight nausea be produced, this contributes to the diaphoretic action.

Advantages of combination, if the power of secreting organs be deranged, with mercurials; and, further, with opium, should pain or sleeplessness be present.

Remarks upon employment of ipecacuanha in Dysentery.

Dose, gr. ½, every two or three hours, in pill. Larger doses may be made to remain upon the stomach. Manner of securing this result.

PULVIS IPECACUANHÆ COMPOSITUS; *Compound Powder of Ipecacuanha. Dover's Powder.*—Composition. Proportion of ingredients. Use of the saline ingredient. Advantages; and sources of the preference to be given to this form. Dose, grs. x, or in divided doses. Mode of administration in the several diseases to which adapted.

ANTIMONII ET POTASSÆ TARTRAS, *U. S.*

Tartrate of Antimony and Potassa.

Tartar Emetic has been considered under the head of the Antimonials. As a diaphoretic, it is used in diseases of excitement.

The diaphoretic effect connected with the sedative impression; but continues after the medicine has been discontinued, showing its decided action upon the skin. Mode of administration. Combinations.

REFRIGERANT DIAPHORETICS.

POTASSÆ CITRAS, *U. S.*

Citrate of Potassa.

Mode of preparing this salt. Reason of preference given to the *Bicarbonate of Potassa* in the formation.

Form; color; taste; solubility; effect of exposure.

Medical Properties.—Sedative and refrigerant. Applies to febrile conditions. Dose, grs. v—x—xx, given in solution. Mode of flavoring.

LIQUOR POTASSÆ CITRATIS, *U. S.*

Solution of Citrate of Potassa.

Mode of preparing.

MISTURA POTASSÆ CITRATIS, U. S.; *Mixture of Citrate of Potassa. Neutral Mixture.*—Made from fresh lemon-juice. Preference given to the *Bicarbonate of Potassa* in the preparation. Necessity of filtration.

Causes of flocculence when the *Carbonate of Potassa* is used. Relative proportion of *Carbonate* and *Bicarbonate of Potassa* to be used.

Dose, f℥ss, with same amount of water, every two hours.

A form of this is the EFFERVESCING DRAUGHT.

Mode of preparing and mixing the solution. Proportions used. Reasons of failure to effervesce, and mode of rectifying it.

Medical Application.—An agreeable refrigerant and diapho-

retic, well received and acceptable to the stomach. Uses in fevers and inflammations. Advantage of the effervescence. Combinations.

LIQUOR AMMONIÆ ACETATIS, *U. S.*

Solution of Acetate of Ammonia.

Spiritus Mindereri, Spirit of Mindererus.—Mode of preparation. Necessity of careful saturation. Color of the solution; odor; taste.

Medical Application.—Used in fevers and inflammatory cases; states of the system to which adapted.

Dose, f℥ss, every two hours. *Acetate of Morphia* may be combined with it, or *Sweet Spirits of Nitre.*

POTASSÆ NITRAS, *U. S.*

Nitrate of Potassa.

Already noticed. In small doses, has more effect upon the skin than on the kidneys. Mode of operation. Employed in inflammatory affections, in acute rheumatism, &c. Dose, grs. v, or less. *Nitrous Powders.*

SPIRITUS ÆTHERIS NITROSI, *U. S.*

Sweet Spirits of Nitre.

This has been considered under the head of Diuretics. In less dose, and by promoting determination to the skin, acts as a diaphoretic. Advantage in combination. Dose, gtt. xx to ℥ss or ℥j. Mode of administration.

ALTERATIVE DIAPHORETICS.

GUAIACI LIGNUM, *U. S.*

Guaiacum Wood.

The wood of *Guaiacum officinale.*

GUAIACI RESINA, *U. S.*

Guaiac.

The concrete juice of *Guaiacum officinale.*

Description of the tree. A native of the West Indies. The wood called *Lignum Vitæ.*

Properties. Division into sap-wood and heart-wood; color of each; consistence; weight; effect of air and nitric acid; odor; taste; effects of heating. Form in which kept in the shops. Adulteration.

Mode of obtaining the *Resin.*

Two forms in which found in shops; appearance of surface; color; fracture; effect of heat; odor; taste. Powder.

Adulterations.

Contains an acrid principle, *Guaiacine.*

Relations to water, ether, and alcohol.

Medical Properties.—Stimulating; diaphoretic and alterative. Effects of large doses on stomach and bowels. Employment in atonic diseases. Contra-indications. Dose, grs. x to xxx. Mode of administration. Advantages of combination.

TINCTURA GUAIACI, U. S.; *Tincture of Guaiacum.*—Mode of preparing. Dose, f℥ss to ij. Mode of administration.

Guaiacum wood enters into the preparation of the *Compound Decoction of Sarsaparilla*, and the *Compound Syrup of Sarsaparilla.*

MEZEREUM, *U. S.*

Mezereon.

The bark of the *Daphne mezereum*, and of *Daphne gnidium.*

Description of these plants. Natives of Europe. All parts of the plant active. Berries.

Properties of the bark; form of pieces; structure; taste. Contains a peculiar principle, *Daphnin.*

Relation to water.

Medical Properties.—Stimulant, with a direction to the skin, and, if this be not promoted, acting on the kidneys. In large doses, it acts upon the stomach and bowels. Poisonous results may arise from over-doses. Irritant effect on the skin.

Employment; cases to which adapted. Decoction made with ʒij of mezereon, and ʒss liquorice root, to Oij water, boiled to Oss. Dose, fʒij to iv.

Enters into the composition of the *Compound Decoction of Sarsaparilla.*

External employment.

UNGUENTUM MEZEREI; *Ointment of Mezereon.*—Mode of preparation. Uses.

The wood used to make *Issue Peas.*

SASSAFRAS RADICIS CORTEX, *U. S.*

Bark of Sassafras Root.

The bark of the root of *Sassafras Officinale.*

Description of the tree. An inhabitant of North America.

Form of the bark; color; consistence; fracture; odor; taste. Relation to water and alcohol.

Contains a volatile oil and tannin, with extractive.

OLEUM SASSAFRAS, U. S.; *Oil of Sassafras.*—Properties.

Medical Properties.—Stimulant to the circulation, and to the secretions; determination to the skin. Effect of over-doses.

Enters into the composition of the *Compound Decoction of Sarsaparilla.*

The oil is an ingredient of the *Compound Syrup of Sarsaparilla.*

SASSAFRAS MEDULLA, U. S.—Uses.

MUCILAGO SASSAFRAS, U. S.; *Mucilage of Sassafras.*

SARSAPARILLA, *U. S.*

Sarsaparilla.

The root of *Smilax officinalis* and other species.

Description of the plants. Inhabitants of Mexico and South America. Erroneous statement with respect to *Smilax Sarsaparilla.*

Several varieties. *Honduras, Jamaica, Caracas, Mexican, Brazilian.*

Honduras Sarsaparilla.—Form and construction of the bales. Division of root into head and fibres. Form of head; length of fibres; size, appearance; color; structure; odor; taste. Value of taste as a test of quality.

Jamaica or Red Sarsaparilla.—Appearance and color. Original source.

Caracas Sarsaparilla.—Appearance; value.

Mexican Sarsaparilla.—Appearance. Points of distinction and value.

Brazilian or Para Sarsaparilla.—Form of the parcel, and preparation of the root. Color; appearance; relative value.

All these varieties contain a principle called *Smilacin.*

Relation to water and alcohol. The best solvent for the active principle is diluted alcohol.

Medical Properties.—This medicine has been variously appreciated from time to time. It appears to be a stimulant to the secretions, especially those of the skin and kidneys, while it improves the digestive powers. From the change in nutrition effected by it, and the determination to the skin, it has been ranked among the alterative diaphoretics. Cases to which adapted. Administration in powder. Dose, ℈j to ʒj.

Decoctum Sarsaparillæ Compositum, U. S.; *Compound Decoction of Sarsaparilla.*—Ingredients and mode of preparation. *Lisbon Diet Drink.* Dose, f℥ij to iv.

Syrupus Sarsaparillæ Compositus, U. S.; *Compound Syrup of Sarsaparilla.*—Mode of preparation. Dose, f℥ss to ij. Combination with other alteratives.

Extractum Sarsaparillæ Fluidum, U. S.; *Fluid Extract of Sarsaparilla.*—Mode of preparation. Dose, f℥j to f℥ij. Advantages.

Extractum Sarsaparillæ Fluidum Compositum, U. S.; *Compound Fluid Extract of Sarsaparilla.*—Ingredients. Dose, f℥j to ij.

ARALIA NUDICAULIS, *U. S.*

False Sarsaparilla.

The root of the *Aralia nudicaulis.*

Wild Spikenard.—Character of the plant. An inhabitant of the United States.

Form, appearance, color, odor, and taste of the root. Therapeutic application and administration.

EXPECTORANTS.

MEDICINES which facilitate expectoration, or the discharge of matters from the lungs, which, if retained, would give rise to difficulty of breathing and pulmonary embarrassment.

They also modify pulmonary secretions.

The secreted matters are, in a state of health, impelled by a natural operation of ascension to the trachea and larynx, whence they escape by a voluntary effort, or by coughing.

Coughing is a forced and sudden expiration. It is brought on by the presence of irritating matters or accumulation in the air-passages of the lungs.

The more fluid and non-adherent the secretions may be, the more easy is expectoration. It is suppressed when there is no secretion, and is copious when there is an abundance of secretion.

In treating the diseases of the lungs, the character of the expectoration is regarded, in order to give an idea of the nature of the disease; it aids the physical and other symptoms.

Substances the most opposite in their action may be employed with the view to their expectorant effects; and these must be chosen according to the diseased action which may be the cause of pulmonary embarrassment.

Thus, if the action be inflammatory, free secretion is prevented and anti-inflammatory and relaxing articles prove expectorant. Illustrations. In more advanced stages of inflammation, with perverted secretion, the stimulating articles are useful. Illustrations. Where there is too great secretion from atony and laxity of tissue, the stimulating and invigorating articles prove serviceable. Illustrations.

There is still another condition, which is attended with difficult expectoration; that is, debility. Where, in such cases, accumulation in the bronchial tubes cannot be removed from want of power, whatever contributes to the muscular power proves expectorant. Proof of this derived from Phthisis.

Expectoration is frequently embarrassed by the pain attendant upon the effort. Anodynes here prove serviceable.

Proof that medical substances reach the lungs by absorption.

Difficulty of expectoration with children. Necessity of aiding it. Advantage of an emetic impression in their pulmonary diseases.

Aid to be derived from demulcent articles.

In the treatment of pulmonary affections, the necessity of protection from clothing enjoined.

Inhalations.

The relaxing expectorants have been treated of under the head of Arterial Sedatives and Emetics. The most potent are *Tartar Emetic* and *Ipecacuanha.*

In doses of gr. $\frac{1}{12}$, $\frac{1}{8}$, $\frac{1}{4}$, repeated every two or three hours. Tartarized antimony proves expectorant in inflammatory cases by relaxing the mucous tissue of the lungs, and relieving inflammatory action. It is usually given in combination. It is constantly used as an addition to cough mixtures and ptisans. Combination stated; also formulæ.

Ipecacuanha as a nauseant is also employed in small doses, varying from gr. $\frac{1}{4}$ to $\frac{1}{2}$—j; but usually in the form of the *Wine*, or the *Syrup,* is employed in compound preparations administered as cough mixtures. The ingredients of such mixtures stated. The TROCHISCI IPECACUANHÆ, U.S., are convenient in some cases. Cases to which this article is adapted.

SCILLA, *U. S.*

Squill.

Previously treated of as an Emetic and Diuretic. It seems to have also a decided value in the treatment of pulmonary affections, and is regarded as stimulating to the mucous lining of

the extreme tubes and cells, thereby unloading them of contained mucus, and restoring healthy secretion.

It is not to be used where there is excitement, and, therefore, is better adapted to the latter stages.

Diseases in which efficacious. Nausea advantageous in some cases. Absorbed.

Modified by combination, and may be given earlier.

The vinegar and tincture noticed among Diuretics.

OXYMEL SCILLÆ; *Oxymel of Squill.*—Mode of preparation. Dose, f℥j to ij. Employment.

SYRUPUS SCILLÆ, U.S.; *Syrup of Squill.*—Mode of preparation. Dose, f℥j to ij; less for children. Employed as an ingredient of cough mixtures.

SYRUPUS SCILLÆ COMPOSITUS, U.S.; *Compound Syrup of Squill.*—Ingredients, and mode of preparation. Advantages. Dose, f℥ss to f℥ij. Emetic effects. Diseases in which used.

PILULÆ SCILLÆ COMPOSITÆ, U.S.; *Compound Pills of Squill.*—Mode of preparing. Ingredients. Employment. One or two given three or four times daily.

ALLIUM, *U.S.*

Garlic.

The bulb of *Allium Sativum.*

Description of plant. A native of England; here introduced.

Structure of the bulb. *Cloves of Garlic.* Odor; taste. Contains a volatile oil.

Medical Properties.—A powerful stimulant. Effect on digestion. A stimulating expectorant. Effect upon the breath. Cases to which adapted.

Rubefacient action.

SYRUPUS ALLII, U.S.; *Syrup of Garlic.*—Mode of preparation. Dose, f℥j.

Employment of *Onions.*

SENEGA, *U.S.*

Seneka.

The root of *Polygala senega.* An inhabitant of the southern portions of the United States.

Properties; size; form; irregularity; peculiar marking; color; structure; odor; taste. Powder.

Contains a peculiar principle, *Polygalic acid.*

Medical Properties.—A stimulating expectorant; acting also upon the kidneys and bowels. In large doses nauseant and emetic. Employment in affections of the lungs, especially pneumonia. Stages of disease when appropriate. Mode of operating. Dose, grs. x to xx.

DECOCTUM SENEGÆ, U. S.; *Decoction of Senega.*—Mode of preparation. Dose, f℥ss to f℥ij, repeated at stated periods.

SYRUPUS SENEGÆ, U. S.; *Syrup of Senega.*—Mode of preparing. Dose, f℥j to ℥ij, or more. Use in cough mixtures.

EXTRACTUM SENEGÆ ALCOHOLICUM, U. S.; *Alcoholic Extract of Senega.* Dose, gr. j to iij.

Senega enters into the composition of the *Compound Syrup of Squill.*

AMMONIACUM, *U. S.*

Ammoniac.

The concrete juice of the *Dorema ammoniacum*, an *umbelliferous* plant found in Persia and Armenia.

In two forms, tears and sorts.

Tears.—Form; size; color; fracture; appearance of the surface.

Sorts.—Formation; appearance; varieties; odor; taste; inflammability. Powder.

Contains gum, resin, and volatile principle.

Relation to water and alcohol.

Medical Properties.—A stimulating expectorant and antispasmodic. Employment. Dose, grs. x to xx, in pill.

MISTURA AMMONIACI, U. S.; *Ammoniac Mixture.*—Mode of preparing. Dose, f℥ss to j.

EMPLASTRUM AMMONIACI, U. S.; *Ammoniac Plaster.*—Mode of preparing and uses.

EMPLASTRUM AMMONIACI CUM HYDRARGYRO, U. S.; *Plaster of Ammoniac with Mercury.*—Advantages and uses.

The *Plaster of Ammoniac and Mercury*, also prepared. Uses.

GALBANUM, U. S.—Source and employment.

BENZOINUM, *U. S.*

Benzoin.

The concrete juice of the *Styrax Benzoin.* A native of the Malaccas, Siam, and Pegu.

Description of the plant. Mode of obtaining the juice.

In two forms, tears and masses.

Tears.—Form; color; fracture; surface.

Masses.—Appearance; structure; impurities; odor; taste.

Contains *Resin*, volatile oil, *Benzoic Acid.*

Relation to water and alcohol.

ACIDUM BENZOICUM, U. S.; *Benzoic Acid.*—Form; appearance; odor; taste; solubility; reaction with bases.

Mode of preparation.

Medical Properties.—Stimulating with a decided action upon the lungs. Employment. Dose, grs. x, in pill, or emulsion.

TINCTURA BENZOINI COMPOSITA, U. S.; *Compound Tincture of Benzoin.*—Ingredients and mode of preparation.

Employment as an expectorant. Dose, f℥ss to j, diluted. Use as a *vulnerary.*

UNGUENTUM BENZOINI, U. S.; *Ointment of Benzoin.*—Purpose of preparation. Uses.

Benzoic acid enters into *Camphorated Tincture of Opium.*

BALSAMUM PERUVIANUM, *U. S.*

Balsam of Peru.

Obtained from *Myrospermum peruiferum.*

Description of the tree. An inhabitant of South America, found in Peru and New Grenada.

Mode of obtaining the balsam. Varieties.

Properties; consistence; color; odor; taste.

Contains resinous principle, *Benzoic acid*, volatile oil, &c.

Medical Properties.—Stimulant. Cases to which adapted. Dose, ℥ss, in emulsion. Local employment.

BALSAMUM TOLUTANUM, *U.S.*

Balsam of Tolu.

The juice of *Myrospermum Toluiferum.*

Description of tree. An inhabitant of Columbia.

Mode of obtaining the juice.

Properties. Consistence; effect of age; color; odor; taste. Effect of heat.

Relation to water and alcohol. Solubility in alkaline solutions.

Contains cinnamic acid, benzoic acid, and volatile oil.

Medical Properties.—A stimulating expectorant. Cases to which adapted. Dose, grs. x to xxx.

TINCTURA TOLUTANA, U.S.; *Tincture of Tolu.*—Mode of preparation. Uses. Dose, f℥ss to j.

SYRUPUS TOLUTANUS, U.S.; *Syrup of Tolu.*—Mode of preparation. Employment in cough mixtures. Dose, f℥j to f℥ss.

EMMENAGOGUES.

THIS class of medicines may be defined to be substances which promote the functional action of the uterus, and which provoke and maintain the periodical occurrence of the menstrual secretion.

As the non-appearance or stoppage of this flux may depend upon different causes, no medicines specific or applicable to every case. The treatment must be governed by general principles. Illustrations from cases of a plethoric character and of an anæmic character.

Must be considered as secondary agents, fulfilling certain purposes necessary to the menstrual function.

Three things necessary: A sound condition of the organ; a sufficient amount of blood in the system to meet the demand; and periodic excitement.

Reference to the importance of the menstrual function, and its connection with health.

Rules for the administration of Emmenagogues, and reasons for preferring one to another in certain cases.

FERRI PRÆPARATA.

Preparations of Iron.

Remarks on their mode of operating. Cases to which adapted. Concomitant course to be pursued. Contra-indications. Advantages of combination with purgatives; with nervous stimulants.

The particular preparations have been presented.

ALOES.

Aloes.

Mode of operation dependent on its purgative action, and determination to the pelvic viscera; stimulating to uterus. Cases to which adapted. Administration. Dose, grs. ij, two or three times daily.

PILULÆ ALOES, U. S.; *Aloetic Pills.*—Preparation. Dose, one or two pills thrice daily.

PILULÆ ALOES ET MYRRHÆ, U. S.; *Pill of Aloes and Myrrh.*—Advantages of the combination. Dose, three to six pills, or two at a time, repeated.

Combination with iron.

HELLEBORUS NIGER, *U. S.*

Black Hellebore.

A stimulant to the uterus, without inducing a purgative impression. Used in atonic conditions. Contra-indications. *Tincture* used. Dose, f℥ss to j, repeated two or three times daily. Mode of administration.

SENEGA, *U. S.*

Seneka.

This has been mentioned under the head of Expectorants. Effect upon the uterus. Cases to which adapted. Value. Mode of administration in powder—dose, grs. v, three times daily; or in decoction.

GUAIACI RESINA, *U. S.*

Guaiac.

Heretofore considered under the head of Diaphoretics. A general stimulant, with a direction to the emunctories. Action on the uterus. Adapted to cold phlegmatic constitutions, and where there is a rheumatic tendency. Advantage of combining with ammonia.

TINCTURA GUAIACI AMMONIATA, U. S.—Mode of preparation. Employment. Dose, f℥j to ij.

Necessity of free dilution.

SABINA, *U.S.*

Savine.

The tops of *Juniperus sabina.* A native of Europe. Introduced.

Description of plant.

Properties of the leaves. Powder.

Contains a volatile oil.

OLEUM SABINÆ, U.S.; *Oil of Savine.*—Characters.

Medical properties.—A powerful stimulant. Effect of inordinate use. Effect on kidneys. Cases to which adapted. Contra-indications. Dose, grs. v to x in powder. Dose of the oil, gtt. v to x. Criminal use to which this is sometimes put.

CANTHARIS, *U.S.*

Cantharides.

Mode of operation as an emmenagogue. Effect upon the bladder. Cases in which used. Contra-indications. Dose, of *Tincture*, gtt. x to xx.

Other Emmenagogues, as *Madder* and *Rue.*

SIALAGOGUES.

SUBSTANCES which produce salivary discharge are designated by this term. The effects of mercury upon the salivary glands, which have been already considered, are not, in the present connection, to be considered as pertaining to the class, as these effects depend upon constitutional impression.

Sialagogues act by a local impression, and are productive of beneficial effects, from free secretion or by revulsion. Cases in which advantage is derived from them. Those ordinarily employed are *Mezereon* and *Tobacco*, which have been presented; or

PYRETHRUM, *U. S.*

Pellitory.

The root of the *Anacylus pyrethrum.*

A native of Europe.

Description of the plant.

Form, color, fracture, odor, and taste of the root.

Contains a volatile oil.

Medical Properties.—Effect upon the gums and mouth. Employment, and cases in which beneficial.

ERRHINES.

MEDICINES employed to make an impression upon the mucous membrane of the nose.

They are used to promote secretion; to relieve the organ of suppression of discharge; or to produce revulsive effects. They may also be used for a local alterative effect.

Suppression of secretions, dependent upon irritation, relieved by mild applications, as the vapor of water. Cases in which a revulsive effect is beneficial. Articles, employed, and necessity of diluting those which are acrid.

When an impression is to be made upon the mucous membrane, or parts connected with it, a relation should be preserved between the state of irritation and the sensibility of the part and the force of the article used. Cases in which this treatment is required, and mode of effecting it. When sneezing is produced, they are called *Sternutatories*.

EPISPASTICS.

SUBSTANCES which by their action upon the skin, produce a blister. Sometimes the terms *Blisters* and *Vesicatories* are used to designate them.

Their impression is local, producing inflammation, terminating in effusion, which separates the cuticle.

Variation of effect depending upon several circumstances. These specified.

Difference of result depending upon the intensity of the inflammation, from mere vesication to sloughing.

Mode of producing vesication.

Effect local at first, but may become general. Explanation.

Indications for their use.

1. *As an evacuant.*—Degree to which this may be carried.

Effect in relieving inflammation or congestion. Character of fluids which are discharged. Effect of such discharges, when profuse, necessarily debilitating.

2. *As derivatives.*—Revulsion and its agency. Explanation of the good and bad effect of their use with this design. Not applicable to the relief of every kind of local excitement, as certain kinds of specific inflammation are not relieved by them. Illustrations. Effect regulated by the seat of the inflammation, and its stages. In early stages, danger from the excitement producing reaction on the inflamed organ. Course to be pursued under these circumstances. Explanation of what is meant by the "*Blistering Point.*" Symptoms which determine it stated. Illustration from diseases of lungs. Considerations with respect to extent of surface to which applied. Necessity of a right choice of position in applying them. Illustrations. A determinate impression required for this indication.

3. *To substitute their action for that of disease.*—Cases where this is beneficial.

4. *As general stimulants.*—Their excitant action taken advantage of in diseases of prostration. Illustrations. Mode of employment in such cases. Danger of sloughing when reaction is established. *Flying Blisters.*

5. *As local stimulants.*—Cases where the impression is salutary by arousing the vital actions in indolent conditions of parts. Cases illustrative of this. Preparation for discutients; for endermic applications.

6. *With the view to an antispasmodic action—to promote rest and allay pain.* Cases cited.

Inordinate susceptibility to their action, and disastrous consequences in such cases. Necessity of caution in the cases of children.

Length of time a vesicatory should be left on the skin.

Mode of treating painful and irritable blisters.

CANTHARIS, *U. S.*

Cantharides.

Cantharis vesicatoria. Spanish Flies.

Description of the insect. A native of Spain and Italy. Mode of collecting and preserving it.

Powder. Appearance; color; odor; taste.

Adulterations. Depredations of an insect upon *Cantharides.* Contain a volatile oil and *cantharidin.*

CANTHARIDIN. Form; color; volatility. Solubility in fatty matters. Relation to water and alcohol.

Medical Properties.—Employed to vesicate, or for the purpose of local stimulation.

CERATUM CANTHARIDIS, U. S.; *Cerate of Cantharides. Blistering Cerate.*—Ingredients, and mode of preparation. Mode of spreading a blister. After-treatment.

CERATUM EXTRACTI CANTHARIDIS, U. S.; *Cerate of Extract of Cantharides.*—Mode of preparation. Employment as a stimulating dressing to blisters, or to produce vesication on delicate skins.

LINIMENTUM CANTHARIDIS, U.S.; *Liniment of Cantharides.* —Made with *Oil of Turpentine.* Mode of preparation. Use as a stimulating liniment, to moisten blisters, and to prepare the skin for their application.

CANTHARIS VITTATA.

Potato Flies.

Cantharis Vittata.

Description of the insect. A native of the United States.

Properties. Employment as a substitute for Spanish Flies.

Other species of *Cantharis.*

Vesicating Taffetas.

COLLODIUM CUM CANTHARIDE, U.S.; *Collodium* with *Cantharides.*

RUBEFACIENTS.

ARTICLES which redden the skin in consequence of the irritation and inflammation they produce are termed Rubefacients. Action upon the capillaries, and fluxionary movement produced by them. Impression on the sensibility of the part to which applied. The impression is either *revulsive*, or stimulating to the entire system.

Employed to make a rapid and potent impression. Successful in proportion to the lightness of the grade of irritation or inflammation they are intended to remove. Advantage of using them in early stages of inflammation, aided by other remedies. Illustration.

Where inflammation is seated, they must give place to blisters.

Advantage of their employment in painful affections. Use as stimulants. Cases to which adapted. In employing them, must be guided by the condition of the circulation and skin.

Extent of surface to be covered by them, and the importance of selecting the right position.

Time of maintaining their impression, and untoward results from their inordinate use.

SINAPIS ALBA, *U. S.*

White Mustard.

SINAPIS NIGER.

Black Mustard.

The seeds of *Sinapis nigra* and *Sinapis alba*. Probably natives of Asia, but cultivated in Europe and this country.

Description of the plants.

White Mustard Seed.—Size; color. Powder, difference between it and the following.

Black Mustard Seed.—Size; form; color externally and internally. Powder; color; odor; taste.

Mustard flour. Liable to be adulterated.

Mustard contains fecula, fixed oil, and a peculiar principle, *Sinapisine;* also *Myrosine* and *Myronic acid.*

Reaction which the principles undergo with water.

Volatile oil. Odor; taste.

Medical Properties.—Entire seeds used as a laxative. Employment of the flour as a rubefacient. Cases to which applicable. Necessity of mixing with warm water. Different modes of application.

CAPSICUM, *U.S.*

Capsicum.

Cayenne Pepper in its rubefacient power, equal and similar to mustard. Modes of application as a plaster, or in the form of tincture as a liniment. Advantage of adding it to stimulant liniments.

OLEUM TEREBINTHINÆ, *U.S.*

Oil of Turpentine.

Character as a rubefacient, and proneness to produce a vesicular eruption. Purposes for which applied, and cases in which serviceable. Added to stimulants.

AQUA AMMONIÆ, *U.S.*

Water of Ammonia.

Liquor Ammoniæ.—Mode of preparation. Rationale. Color; odor; taste. Sp. gr. 0.96.

A rapid and potent rubefacient. Cases to which applicable. Caution in employment.

Granville's Lotion.—Uses.

LINIMENTUM AMMONIÆ, U.S.; *Liniment of Ammonia.*—Mode of preparing. Employment.

PIX BURGUNDICA, *U.S.*

Burgundy Pitch.

The prepared concrete juice of the *Abies excelsa.*

Description of the tree. A native of mountain districts of France, Germany, and North of Europe.

Mode of obtaining the pitch. Preparation.

Properties; consistence; tenacity; color; effect of heat and cold; odor.

Two resins in its composition, and volatile oil.

Adulterations.

Medical Properties.—A stimulating application, employed to keep up action on the cutaneous surface. Affections to which suited. Effect on some skins.

EMPLASTRUM PICIS BURGUNDICÆ, U.S.; *Burgundy Pitch Plaster.*—Mode of preparing. Employment not only as a stimulant to skin, but to produce mechanical support.

EMPLASTRUM PICIS CUM CANTHARIDE, U.S.; *Plaster of Pitch with Spanish Flies. Emplastrum Califaciens, Warming Plaster.*—Mode of preparation. Uses.

Enters into the composition of the *Compound Galbanun Plaster*, U.S.

PIX CANADENSIS, *U.S.*

Canada Pitch.

Hemlock Pitch.—The prepared concrete juice of *Abies Canadensis.*

Description of tree. Native of North America.

Mode of procuring the pitch.

Properties; form; color; odor.

Contains resin and volatile oil.

Medical Properties.—Has the same effect on the skin as the *Burgundy Pitch Plaster*, and may be employed for the same purposes.

EMPLASTRUM PICIS CANADENSIS, U.S.; *Plaster of Canada Pitch.*—Uses.

ESCHAROTICS.

SUBSTANCES which destroy vitality in the part to which applied, producing disorganization, and a slough.

They may act chemically, or by direct impression. Chemically, they produce their effect by an attraction for the watery constituent of tissues, or by a union with the animal elements.

They are used to remove diseased growths. Illustration. To alter the action in diseased parts. Illustration. To open abscesses, and to make issues.

POTASSA, *U. S.*

Potassa.

Caustic Potassa. Hydrate of Potassa.—Mode of preparation. Rationale.

Form; density; color; fracture. Attraction for moisture. Impurities.

Properties as a caustic, rapid and energetic. Mode of acting. Employment. Method of applying it.

POTASSA CUM CALCE, U. S.; *Potassa with Lime. Vienna Paste.*—Preparation. Application.

ACIDUM ARSENICUM, *U. S.*

Arsenious Acid.

Before considered under the head of Alteratives. Character as an escharotic. Objection to its use from the constitutional impressions. Forms of application. Abuse as a quack application.

ARGENTI NITRAS FUSA, *U. S.*

Fused Nitrate of Silver.

Lunar Caustic.—Mentioned previously. Mode of action as a caustic. Cases to which adapted. Mode of application, solution or in stick. Strength of solution, grs. xx—xxx to f℥j. Effect as an alterative on diseased surfaces.

HYDRARGYRI CHLORIDUM CORROSIVUM, *U. S.*

Corrosive Chloride of Mercury.

More frequently employed as a stimulating application than as an escharotic. Its application is attended with much pain. Used in watery solution, grs. x to f℥j. Cases in which serviceable.

LIQUOR HYDRARGYRI NITRATIS, *U. S.*

Solution of Nitrate of Mercury.

Mode of preparation. Chemical nature.

Consistence; color. Use as an alterative to surfaces.

Acid Nitrate of Mercury.—Mode of preparation. Properties. Use as a potent escharotic in the treatment of diseases of the uterus. Mode of managing the application.

Acidum Chromicum, U.S.; *Chromic Acid.*—Properties and uses.

Alumen Exsiccatum, U.S.; *Dried Alum.*—Mode of preparing. Form and properties. A feeble escharotic. Employment.

Mineral Acids.—Used as escharotics, but objected to on account of their extension. *Nitric Acid* is most used—sometimes employed to remove the cuticle rapidly.

Actual Cautery.—Mode of employment. Effect upon the parts to which applied. Employment by surgeons. Design with which used. Cases in which serviceable.

Moxa.—Substances from which formed. Mode of application. Mode of operation. Cases in which serviceable. Objection to their use.

DEMULCENTS.

THESE are bland substances, readily dissolved by water, and which produce a calming, soothing effect upon irritated or inflamed surfaces.

Many of them are nutritious, and are used as articles of diet, adapted to feeble power of digestion, or to an irritated stomach, when more exciting articles cannot be taken.

Cases of disease to which they are adapted. They seem not only suited for the organs with which they come in direct contact, but are directed to irritation in organs remote, and seem to diminish acridity of the secretions.

Useful as a mode of directing drink, and are frequently employed, when in solution, as the vehicles for medicines.

ACACIA, *U. S.*

Gum Arabic.

The concrete juice of *Acacia vera* and other species of *Acacia.*

Description of the tree. Common in Egypt and Arabia.

Mode of procuring the gum. Season during which collected.

Commercial source.

Two varieties. Gum Arabic and Gum Senegal.

Gum Arabic.—Form; color; consistence; friability; appearance of fractured surface; taste. Color of powder.

Gum Senegal.—Form; appearance; color; fracture. Varieties.

Relation to water and alcohol.

Peculiar principle called *Arabin.*

Substances with which precipitates are formed.

Adulteration.

Medical Properties.—Soothing and demulcent; extensively used in medicine. Consumed in cough mixtures. Proof that it is nutritious. Use in inflammatory affections. Employment in *Emulsions.*

MUCILAGO ACACIÆ, U.S.; *Mucilage of Acacia.*—Strength. Uses.

SYRUPUS ACACIÆ, U.S.; *Syrup of Gum Arabic.*—Mode of preparing. A convenient preparation. Application. Employment of this preparation, or gum Arabic, in pharmacy. Changes from keeping in solution.

TRAGACANTHA, *U.S.*

Tragacanth.

The concrete juice of *Astragalus verus.*

Description of tree. An inhabitant of Turkey in Asia.

Mode of exudation.

Properties; form; appearance; color; consistence; odor; taste. Powder; difficulty of forming it.

Effect of water upon it. Insolubility in alcohol.

Contains *Arabin*, *Tragacanthin*, and *Starch.*

Medical Properties.—Demulcent; employed principally to give consistence where a thick mucilage is required. Nutritive. Employed to form *Troches.*

MUCILAGO TRAGACANTHÆ, U.S.; *Mucilage of Tragacanth.*

ULMUS FULVA, *U.S.*

Slippery-elm Bark.

The inner bark of *Ulmus fulva.*

Description of tree. A native of the United States.

Properties of the bark. Color; structure; odor; taste.

Relation to water.

Medical Properties.—A useful demulcent. Used internally, or as an external application. The powder is employed to form cataplasms.

MUCILAGO ULMI, U.S.; *Mucilage of Slippery-elm Bark.*—Mode of preparation. Employment.

LINUM, *U. S.*

Flaxseed.

The seeds of the *Linum usitatissimum.* The common *Flax.*

Properties of the *seeds.*

Contain an oil and a large amount of mucilaginous matter.

OLEUM LINI, U. S.; *Linseed Oil.*

Relation to water.

Medical Properties.—Much employed as a demulcent. Used as a drink, with articles to flavor the solution of mucilage. Mode of preparing the draught.

INFUSUM LINI COMPOSITUM, U. S.; *Compound Infusion of Flaxseed.*—Used as a cough mixture, either alone or with the addition of expectorants.

LINI FARINA; *Flaxseed Meal.*—Powder used in cataplasms.

GLYCYRRHIZA, *U. S.*

Liquorice Root.

The root of the *Glycyrrhiza glabra.*

EXTRACTUM GLYCYRRHIZÆ, *U. S.*

Liquorice.

The extract of the root of *Glycyrrhiza glabra.*

Description of the plant; also of *G. echinata.*

They are natives of Spain and Italy.

Root.—Size; form; appearance; structure; color externally and internally; odor; taste; liability to be worm-eaten. Powder.

Contains starch and a sweet principle called *Glycyrrhizin.* Characters of this principle.

Medical Properties.—Used generally to cover the taste of acrid substances. Made into *Decoction.*

Extract.—Form; color; consistence; odor; taste; solubility in water; impurities. *Refined Liquorice.*

Medical Properties.—An agreeable demulcent. Extensively used in cough mixture. Laxative.

MISTURA GLYCYRRHIZÆ COMPOSITA, U. S.; *Compound Mixture of Liquorice.—Brown Mixture.*

TROCHISCI GLYCYRRHIZÆ ET OPII, U. S.; *Troches of Liquorice and Opium.*—Mode of preparing. Uses.

CETRARIA, *U. S.*

Iceland Moss.

Cetraria Islandica.—An inhabitant of the most northern portions of the world. First procured from Iceland.

Mode of collecting it.

Properties; form; color; appearance of surfaces; odor; taste; relation to water.

Constituents; bitter principle, *Cetrarin; Lichen Starch;* peculiar acids.

Action of iodine upon the solution.

Medical Properties.—Mucilaginous, demulcent, and tonic; well adapted to pectoral affections. It is nutritive. Cases benefited by its use. Mode of removing its bitterness.

DECOCTUM CETRARIÆ, U. S.; *Decoction of Iceland Moss.*—Mode of preparation. Dose, f℥j to iv, every three or four hours.

CHONDRUS CRISPUS, *U. S.*

Irish Moss.

Carrageen.—Found on the coast of England and Ireland.

Characters of plant.

Properties; form; color; odor; taste.

Contains vegetable jelly, mucus, and resins.

Medical Properties.—Nutritive and demulcent.

Cases to which adapted. Mode of preparing and administering. *Decoction.*

MARANTA, *U. S.*

Arrowroot.

The fecula of the root of *Maranta arundinacea.* A native of the West Indies. Introduced into some of the Southern States.

Description of the plant. Characters of the root.

Fecula.—Mode of preparing; form; appearance; color; liability to mustiness; insolubility in cold water.

Adulterations. Mode of detection.

Structure and appearance of the granule. Action of boiling water upon it.

Medical Properties.—When properly prepared, a nutritious demulcent. States of the system to which adapted, and diseases in which used. Mode of preparation and of flavoring.

FLORIDA ARROWROOT, from *Zamia integrifolia.*

SANDWICH ISLAND ARROWROOT, from *Tacca oceanica.*

CANNA, U. S. Canna, *Tous les Mois.*—From an undetermined species of canna, probably *Canna coccinea.* Properties and tests.

TAPIOCA, *U. S.*

Tapioca.

The fecula of the root of *Janipha manihot.* A native of the West Indies.

Description of the plant. Varieties of the root.

Properties; form; color; structure of grains; taste; appearance of the granule; partial solution in cold water.

Medical Properties.—Like those of *Arrowroot.* Mode of preparing for use. Action of boiling water.

Cassava Bread.

SAGO, *U. S.*

Sago.

The prepared fecula of the pith of *Sagus rumphii.* A native of the Malacca Islands.

Description of the plant.

Mode of obtaining sago. Varieties.

Pearl Sago.—Form; color; taste; structure of the grains; relation to water; appearance of the granules.

Common Sago.—Form; color; appearance.

Medical Properties.—A nutritious demulcent like the preceding. Mode of preparation and employment. Rendered palatable by wine, sugar, and nutmeg.

HORDEUM, *U. S.*

Barley.

The decorticated seeds of *Hordeum distichon.* A native of various parts of the Old World. Introduced.

Preparation of Barley, called Pearl Barley.

Characters. Contains gum and fecula.

Formed into malt by germination and arrest of the process. Transformation of fecula into sugar.

Medical Properties.—Demulcent and nutritious. When prepared by decoction. A useful drink for patients laboring under inflammation or febrile diseases.

DECOCTUM HORDEI, *U. S.; Decoction of Barley.*—Mode of preparation. Adjuvants. Exhibition.

SALEP.—The tubers of the *Orchis Mascula* and other species. Properties; preparation; employment.

EMOLLIENTS.

BLAND and unirritating substances, which serve to retain heat and moisture, are called Emollients. They are adapted for the formation of Poultices and Cataplasms, which are employed to soften, relax, and promote action of the skin; or to promote suppuration from granulating surfaces. In many cases the use of light articles is important, as, for instance, over-inflamed organs, or sensitive portions of the body. When speaking of applications to the skin, the articles principally used for this purpose were enumerated, and their advantages pointed out.

DILUENTS.

Water is generally regarded as the only diluent; yet demulcent substances come under this denomination, when freely given in solution, as they serve to dilute the contents of the stomach and bowels, and may in some cases be carried into the bloodvessels, and impress remote organs concerned in secretion, or affect the whole mass of blood favorably. The employment and management of Drinks in the promotion of diuresis and diaphoresis have been explained. Whatever article is employed of those enumerated under Demulcents may be rendered agreeable to the patient by the addition of adjuvants; and in these the taste of the invalids ought to be gratified as far as proper.

ANTACIDS.

THESE substances neutralize the injurious properties of acids by combining with them in the stomach and bowels.

They are the alkalies or the alkaline earths, and by combination with acids, neutral salts are formed, which may be absorbed and eliminated by the kidneys, or be thrown off by purgation.

They also aid in the digestion of fatty substances.

The urine becomes alkaline under their use.

Prolonged employment of them will disorder the digestive functions, and ultimately occasion a liquefacient effect upon the blood and the tissues.

Cases illustrative of this impression.

Not to be regarded remedial so much as palliative agents in acidity of the stomach. Illustration.

Diseases to which applicable.

Sorbefacient employment.

LIQUOR POTASSÆ, *U. S.*

Solution of Potassa.

Mode of preparing.

Color; taste.

Medical Properties.—Used as an antacid in dyspepsia, with bitter infusions. Dose, gtt. x to xx.

The *Carbonates of Potassa* have been considered.

An *infusion of hickory ashes and soot* is sometimes used; but it has been abused, and bad results have followed. Mode of preparation. Dose, f℥j to ij, three times daily.

LIQUOR SODÆ, *U. S.*

Solution of Soda.

Mode of preparation. Sp. gr. 1.071. Dose, gtt. x.

SODÆ CARBONAS, *U. S.*

Carbonate of Soda.

Sources. Mode of preparation. Plants affording it.

Properties; form; appearance; effect of exposure; solubility: action of acids; taste.

Composition. Impurities.

Medical Properties.—Antacid. Cases in which serviceable. Mode of administration. Dose, grs. v to x.

SODÆ BICARBONAS, *U. S.*

Bicarbonate of Soda.

Supercarbonate of Soda.—Mode of preparation. Rationale.

Form; effect of exposure; effect of heat; taste; solubility in water.

Composition.

Medical Properties.—More used than the preceding from its modified alkaline taste. Dose, grs. x to xxx.

PULVERES EFFERVESCENTES, U.S.; *Effervescing Powders. Soda Powders.*

TROCHISCI SODÆ BICARBONATIS, U.S.; *Troches of Bicarbonate of Soda.*—Mode of preparing. Uses.

LIQUOR AMMONIÆ, *U. S.*

Solution of Ammonia.

Previously considered.

Medical Properties.—Stimulating as well as antacid. Cases in which useful. Dose, gtt. v to x.

SPIRITUS AMMONIÆ, *U. S.*

Spirit of Ammonia.

Spoken of under the head of Stimulants. Employment. Dose, gtt. v to xv.

LIQUOR CALCIS, *U. S.*

Lime Water.

Aqua Calcis.—Mode of preparing. Strength.

Color; effect of exposure to the atmosphere, and mode of obviating; taste.

Medical Properties.—Not only antacid, but sedative to the stomach. Employment in dyspepsia, and in irritability of the stomach. Adapted to children. Combination with milk. Dose, f℥ss; for children, f℥j.

CRETA PRÆPARATA, *U. S.*

Prepared Chalk.

Mode of preparing.

Properties; form; color; taste.

Medical Properties.—Antacid and absorbent. Employment in bowel affections. Dose, grs. v to xx.

Combinations.

Mistura Cretæ.—Formula. Dose, f℥ij to f℥ss.

Trochisci Cretæ, U. S.; *Troches of Chalk.*—Mode of preparing. Uses.

CALCIS CARBONAS PRÆCIPITATA, *U. S.*

Precipitated Carbonate of Lime.

Mode of preparing. Rationale. Advantages. Dose, grs. v to xx.

TESTA PRÆPARATA, *U. S.*

Prepared Oyster-shells.

Mode of preparing. Properties. Supposed advantages. Dose, same as preceding.

CALCIS PHOSPHAS PRÆCIPITATA, *U. S.*

Precipitated Phosphate of Lime.

Mode of preparation. Rationale. Uses in scrofula and analogous diseases. Dose, gr. ij. v.

Magnesia has been treated of under the head of Cathartics. As a mere antacid and absorbent, it is sometimes employed in small doses. For children it may be used in this way, or a solution of magnesia prepared like lime-water, and used in the same manner.

ANTHELMINTICS.

THESE medicines aid or cause the expulsion of worms from the alimentary canal.

They accomplish this object by debilitating them, and enabling purgatives to remove them; or by destroying their vitality.

Another mode is impressing them by mechanical means, rendering them uneasy in their position, and making them lose their hold, when purgatives will effect their removal.

An opinion has been expressed with regard to muscular resistance, in the larger worms, opposing the peristaltic movements.

Irritation from the presence of worms, and symptoms of derangement from this cause, both local and general.

Necessity of making a diagnosis in treating cases for worms, and the danger of proceeding blindly.

SPIGELIA, *U. S.*

Pinkroot.

The root of *Spigelia Marilandica.* A native of the Southern States. Called also *Starbloom* and *Carolina Pink.*

Description of the plant.

Properties. Form; structure; color; odor; taste. Source.

Contains a volatile oil, resin, and extractive.

Medical Properties.—Mode of impression, poisonous to worms. Acting upon the system, if given too freely, and danger from this effect. Dose in powder, grs. xx. Half the quantity for children from two to four years; to be given night and morn-

ing for three or four days; to be followed by a brisk purgative. Calomel sometimes combined with it.

INFUSUM SPIGELIÆ, U. S.; *Infusion of Spigelia.*—Mode of preparing. Dose, f℥ss to f℥iv, given night and morning, followed by a brisk cathartic.

Ingredients of *Worm Teas.*

EXTRACTUM SPIGELIÆ FLUIDUM, U.S.; *Fluid Extract of Spigelia.*—Mode of preparation and uses. Dose, f℥j.

EXTRACTUM SPIGELIÆ ET SENNÆ FLUIDUM, U.S.; *Fluid Extract of Spigelia and Senna.*—Mode of preparing. Advantages. Dose, f℥j to ij; well fitted for children.

CHENOPODIUM, *U.S.*

Wormseed.

The fruit of *Chenopodium anthelminticum.* A native of the United States. Called sometimes *Jerusalem Oak.*

Description of the plant.

Fruit; time when collected; size; color; odor; taste.

Contains a volatile oil.

OLEUM CHENOPODII, U.S.; *Oil of Wormseed.*—Mode of obtaining; consistence; color; odor; taste. Effect of age upon it.

Another species, the *Chenopodium ambrosioides,* sometimes mistaken for the *officinal.* Points of distinction.

Medical Properties.—All parts of the plant are efficacious; the effect seems to be poisonous to the round worm especially. Seeds given in an electuary. Dose, ℈j to ij. Leaves used in decoction, with milk. The oil is given in doses of gtt. v to xx.

SANTONICA, *U.S.*

Santonica.

Levant Wormseed.—The unexpanded flowers and peduncles of *Artemisia Contra,* and other species of Artemisia.

Sensible properties; odor; taste. Contain *Santonicum,* U.S. *Santonin.*—Mode of preparing.

Sensible properties. Dose, gr. v—xx.

AZEDARACH, *U. S.*

Azedarach.

The bark of the root of *Melia azedarach. Pride of China.* A native of Asia, but introduced and flourishing in the Southern States.

Description of tree.

Properties of the bark; appearance; odor; taste.

Medical Properties.—Similar to those of *Spigelia.* Effects upon the stomach and bowels those of an emetic and cathartic. Used in *Decoction.* Dose, f℥ij to iv; for a child, f℥ss.

MUCUNA, *U. S.*

Cowhage.

The hairs of the pods of *Mucuna pruriens.* A native of East and West Indies.

Description of plant.

Fruit; bristles.

Medical Properties.—Acts mechanically. Used in syrup, as an electuary. Dose, ℥j to ij.

FILIX MAS.

Male Fern.

The *rhizoma* of *Aspidium Filix Mas.* A native of Europe.

Description of the plant.

Root. Properties; form; color; fracture; odor; taste. Powder. Effects of time and exposure. Relation to water, alcohol, and ether.

Medical Properties.—A powerful astringent. Mode of operating. Dose, ℥j. *Ethereal Extract,* dose, grs. x to xx.

GRANATI RADICIS CORTEX, *U. S.*

Bark of the Pomegranate Root.

The plant has already been described. It is used more especially in cases of tapeworm. It is a most powerful styptic, and probably acts by this impression. Used in strong *Decoction,* ℥ij

to Oij water, boiled to one-half. Dose, f℥j—ij, or as much as the stomach will bear.

OLEUM TEREBINTHINÆ, *U. S.*

Oil of Turpentine.

Has been in use for many years as a remedy for tapeworm, but with varied reputation. Should be given in large doses, followed by castor oil; or it may be combined with it. Danger from too large doses. Advantages where other kinds of worms exist.

PEPO, *U. S.*

Pumpkin Seed.

Used in infusion. Uses.

ROTTLERA, *U. S.*

Kameela.

The powder and hairs obtained from the capsules of *Rottlera tinctoria.*

Sensible properties. Uses.

BRAYERA, *U.S.*

Koosso.

The flowers and unripe fruit of the *Brayera anthelmintica.* Grown in Abyssinia.

Character; odor; taste.

Value as an anthelmintic. Mode of administration.

STANNI PULVIS.

Powder of Tin.

Mode of preparation.

Properties.

Acts as a mechanical agent. Dose, ℥j to ij, given in syrup, two or three times daily.

THE

OPERATION OF MEDICINES

THROUGH THE

MEDIUM OF THE NERVOUS SYSTEM

AND BY

ABSORPTION.

LECTURE I.

If we consider the control which the nervous system exercises over all the organs of the body, both in a physiological and pathological point of view, it is evident that impressions made by medicines upon this system must be potent in modifying the actions and functions of the organs. Nor is it solely that an influence is directed upon their actions and functions, for their very constitution and physical condition are dependent upon the nervous system, and are affected through its instrumentality.

In endeavoring to ascertain how far the nervous system is concerned in the *modus operandi* of medicines, it becomes necessary to inquire into the office, not only of the central masses, but of the particular nerves with which organs are supplied, and on which their functions and physical state depend. The inquiry involves the study of this intricate subject to the full extent of the knowledge that scientific research now affords, as well as by still further investigation.

Medicines, as well as physical agents, impress the organs through the medium of the nervous system, both from within and from without. They act upon the central ganglia, and upon the peripheral extremities of nerves which issue from, or have their connection with, these bodies; and to explain many of the phenomena exhibited by the impression of medicinal substances upon the organs, where the nervous system is concerned, we must admit the introduction of them into the bloodvessels as a previous condition. It is impossible, therefore, to separate the two modes of operation, which will be fully appreciated as the discussion of this branch of the subject develops the facts.

It may at this point be observed that medicines acting upon the general system or upon special organs are capable of inducing phenomena of exalted or diminished activity; in other words, they act either as *stimulants* or *sedatives*. In the estimation of the part played by the nervous system in the operation of medicines, these modes of operation are to be clearly distinguished. The conclusions to be arrived at in seeking an explanation of the observations submitted to us, are based upon the distinction mentioned.

It has been stated by authorities that medicines operate through the medium of sympathy. This is an indefinite and unsatisfactory mode of referring to the impression of medicinal agents through the medium of the nervous system. A general term has been employed without that definite meaning which a full exposition of the peculiarities of the nervous system can alone supply, and without an analysis of phenomena which are widely different. Full exemplification of the complicated operations of the entire nervous system in connection with the action

of medicines is essential to the clear comprehension of influences which are thereby brought to bear upon it.

In using the expression *sympathy*, it must be understood to designate the relations which exist between organs through the instrumentality of the nervous system; by which a uniform, harmonious performance of functions is preserved, and a normal condition relatively to each other is maintained, so that the well-being of the individual is continued until some disturbance has been introduced. Another designation that has been employed to indicate this state is "Consensus Partium," consent of parts, which defines its own meaning. It is through the sympathetic connections that impressions made upon one organ or part are communicated to others.

By Bichat, it was supposed that the sympathies were anormal, that they were diseased manifestations. It has now been demonstrated that they are always in existence, performing their office none the less surely, because they are not observed. By aberration of functional or organic movement in particular organs, they become defined, and are brought into bold relief. Formerly every species of association between organs was confounded with the sympathies, and the greatest latitude was assumed in enumerating them. Barthez included under them all the relations that were discovered in connection with the organs. Haller assigned six causes to the sympathies, in doing which he made the same error; and John Hunter has treated of them in so indefinite a way as to render his account of little consequence at the present time. The sympathies were perceived by these eminent physiologists, but not understood, and hypothetical statements and conjectures were made with regard to them which later information has corrected. As an illustration, what was denominated and explained as *contiguous* and *continuous sympathy*, has the same source and location in the nervous system as other sympathies.

The true sympathetic relations have been demonstrated to have their existence through the intervention of the nervous system, although other relations involve more or less this kind of connection. The most satisfactory separation and definition of organic relations have been made by Adelon, as follows:[1]—

1. Mechanical Relations.
2. Functional Relations.
3. Sympathetic Relations.

Mechanical Relations are such as depend on the position of parts, disturbance of which entails derangement of the movements or functions of contiguous organs. Numerous illustrations of these relations may be adduced: Thus, the uterus in its proper situation interferes neither with the bladder nor rectum, but in a state of prolapsus induces micturition and a difficulty of urination, or disturbance of defecation. The lungs in the state of health do not embarrass the heart, yet when effusion has taken place into the pleural sac, the pressure upon that organ is a serious difficulty. Engorgement or enlargement of an organ may have a physical influence upon a neighboring one, as enlargement of the liver upon the stomach, bowels, or kidneys. Engorgement of the

[1] Traité de Physiologie. Dictionnaire de Médecine, ou Repert. Gén., &c., art. Sympathie.

liver affects the bloodvessel system of the mucous membrane of the alimentary canal, inducing diarrhœa. The gravid uterus encroaches upon other organs and occasions trouble of them. It does not follow necessarily that mechanical derangement or displacement entails disturbance. Many cases are on record where this has happened without such result; a remarkable power of adaptation is sometimes exhibited in this particular.

In cases of mechanical disturbance, the true sympathies may, however, be aroused, as the irritation induced in an organ is sympathetically transmitted to other organs; tenesmus in connection with the bowels or bladder may be produced by such a cause. There are numerous other illustrations.

Functional Relations.—These exist between organs, either in close proximity or distant from each other, in consequence of the partial, or entire dependence one upon the other for the maintenance of their functions. Thus, there is a functional relation between the brain and the heart, irrespective of any sympathy, direct or emotional, as the brain cannot act without the blood from the heart. The heart and the lungs are connected by similar functional relations. Under this head, in like manner, may be placed the relations between the absorbing apparatus and the eliminating structures.

Sympathetic Relations.—These alone can be embraced under the head of legitimate sympathies. They depend exclusively upon nervous influence for their existence, as it is the bond of union between the organs. The importance of an analysis of the sympathies, and, as far as possible, a classification of them, is obvious before an attempt can be made to investigate the subject of medicinal impression through their agency. The functions of the nervous system may be considered under the following heads: those of the spinal axis, of the brain, and of the ganglionic system. The sympathies are in connection with parts of the economy appropriated to animal life, or that of relation, as well as such as are devoted to organic movements and operations incident to organic life, or that concerned in the preservation of the organism.

The following arrangement may be adopted:—

Life of Relation, or Animal Life.	1. Connected with excitation and motion.	Excito-motor sympathy.	Spinal axis.
	2. Connected with sensation and motion involving the senses.	Sensori-motor, or Sense Sympathy.	Cerebro-spinal axis.
	3. Connected with volition and emotion.	Excito-voluntary, or will sympathy. Ideo-motor.	
Organic Life.	Connected with the maintenance of the movements and organic changes determining nutrition, secretion, &c.	Excito-nutritive sympathy.	Ganglionic system.

For the elucidation of the sympathies in accordance with the arrangement thus sketched, it is not required to present a detailed account of

the nervous structures, as the full description of them is given in all authoritative works upon physiology. Such facts alone need be cited, with reference to the anatomy and physiology of the nervous system, as are essential to the development of the modus operandi of medicines through this medium, and to the exhibition of the basis upon which the conclusions arrived at are founded. The views that have been given or opinions entertained by late physiological writers, as to the source or origin of some particular phenomena and their dependence upon special structural provision, will be alluded to in the exposition of the several points as they occur for consideration.

In a general sense, by the term ganglia are understood the especial nerve centres, which are necessary for the existence of the sympathies. The nerves have an appropriate office as well as the ganglia, and thanks to the skilful experimenters of late years, who have exercised their ingenuity and industry in elucidating this difficult subject, we are in possession of the knowledge requisite to remove many difficulties apparently insurmountable.

An analysis of the functions of nerves connected with the cerebro-spinal axis determines them to be *excitor*, *sensory*, and *motor*.

The *excitor* nerves are those which receive an impression and convey it to a centre, without that impression being attended with feeling or consciousness, and thus exciting irradiated movements.

The *sensory* nerves are devoted to the special senses and to common sensation. It is to be understood that a nerve thus appropriated is limited to its own office; there can be no commutation or substitutive operation. The nerves of sense are not endowed with the function of common sensibility.

The *motor* nerves communicate movements, and set the organs into operation, or keep them so when functional operations have been started in the economy.

In this division of the nerves, the sympathetic will be found to be included when their mode of operation comes to be considered.

As the excitor and sensory nerves are the means of receiving impressions from without or within the body, they have been called the *afferent* nerves; their line of functional action is from their *peripheral extremities* to the centres, and it is hence *centripetal* in its nature, while the line of action of motor nerves is directly the reverse; the power originates in the centre and is thrown out through the nerve branches; they are then *efferent* nerves, and act by radiation or centrifugally.

By Dr. Marshall Hall the terms *incident* and *reflex* are employed for the excitor and motor nerves. They are also called by him *excito-motor*.

The nervous fibrillæ, whether for excitation, sensation, or motion, do not inosculate; there is no fusion of one into another; they are true conductors which carry their communications to or from the centres, and no matter in what way they are arranged, either singly or in plexuses for the convenience and protection of the organs, are, unless disturbed in transit, ever ready to perform their office. By some physiologists the nerves are regarded as so many lines of intelligence, like the telegraph wires, solely to transmit impressions or motor influence. In this light they cannot be considered. Nerves possess their own inherent capability within themselves, to which Haller gave the name of *vis nervosa*. It resides in the entire nerve fibre, from origin

to termination, and is intimately associated with the pulpy matter, so that any solution of continuity or obstacle to the transmission of impressions, interferes with the control or influence of the centres and their corresponding functional operation. The power of transmitting impressions or producing sensation, and of exciting movement, consequently exists in all portions of the nerves devoted to these offices. This *vis nervosa* resolves itself into *excitability;* when aroused in the sensitive nerves it gives rise to sensation, or when the excitor nerves are impressed may communicate the stimulus to the centre. When acted upon in motor nerves, motion is the result. That motor excitability is inherent in the nerves is shown when, in connection with muscles, they are removed from communication with the cerebro-spinal axis, and by stimulating a trunk or its branches muscular contraction is produced. It is a question whether the irritability of muscles does not depend upon this latent excitability of the nervous distribution in their interstices. The maintenance of tone in the muscles and organs is due to a similar cause.

From the course which nerve action must unavoidably pursue, as has been shown by the foregoing exposition, from the peripheral terminations of the excitor and sensory nerves in the organs to the *central ganglia*, and from the ganglia by reflection again into the organs, it becomes apparent that the ganglionic centres are the seats of *reflex action.*

In presenting the foregoing sketch of the peculiarities of nervous action, the object in view has been to pave the way for the elucidation of the *especial manner* in which agents are capable of impressing the nervous system, thereby affecting the sympathies and modifying the functional and organic actions. It will be shown that the mode of impression is in accordance with the *laws* which regulate the normal operations of the nervous system; and in classifying the phenomena which are presented, the importance of the analysis of the sympathies which has been given will be made evident. In exhibiting the evidence of this especial manner of operation through the medium of the nervous system, the distinction is to be clearly drawn between such impressions as are purely nervous, and such as are produced by introduction into the circulation, which are in their nature compound. Both of them will be elucidated.

Agents which affect the economy or especial organs in accordance with the sympathies, accomplish this in the *direct line* of nervous action, which is either from the peripheral extremities of the nerves to the nerve centres, or from the centres to the organs of the body. There is no other mode by which the functions of the nervous apparatus are called into activity, no short cut of nervous communication from organ to organ, or even from one portion of an organ to another. The excitor or sensitive nerves are the instruments of conduction from the *peripheral extremities to the centres*, be this effected with or without consciousness, and be the result mere sensation or reflex action. This may be termed the *line of cognizance* to impressions. On the other hand, the motor nerves convey the excitement to action from the centres to the tissues in which they are distributed. This may be called the line of *motor activity* or *motor impulse.* In performing experiments upon nerves, these facts are constantly made evident. Upon cutting the sensitive or excitor nerves, the end connected with the cen-

tre alone is impressible and can be excited, while of motor nerves the divided end towards the periphery is the only one that can produce contraction. If sensibility in this latter case is a concomitant of induced movement, it is due to the recurrent branch on the motor nerve, and is known as recurrent sensibility. In studying the effects of agents it is important to keep these facts prominently in view.

That certain means of directly impressing the nervous system are at command has been demonstrated by experiment, as well as by medical and surgical experience. Excitability, which is a property of organized bodies, is possessed in the highest degree by the nervous system, which under stimulation produces different results, as it exists in the several portions supplying the organs and tissues. Whether in all cases, however, the mode of impressing the excitability is the same, there may be entertained a doubt, although we have the opinion of Müller that "all stimuli, however different they may be from each other, act in the same manner; agents the most dissimilar produce the same effects, because that on which they act possesses but one kind of excitable force, and because they themselves act here by virtue of the same quality, that of stimuli."[1]

The agents which stimulate the nervous system are numerous. Mechanical irritation produces sensation where the nerve fibres are continuous to the cerebro-spinal axis; pain is the consequence of compression, puncture, or laceration. The sensation of touch is produced by gentle apposition of bodies. Mechanical irritation induces reflex action in connection with excitor and reflex motor nerves below the point where the spinal axis is divided transversely. Heat is a positive stimulus to the nervous system; it may be applied externally or internally, and arouses this system in all the organs of the economy; by reflex action it not only affects the part to which applied, but arouses action in the entire organism. Cold, the converse of heat, is also a stimulus when suddenly applied, and leads to the exhibition of nervous activity. By both, in the sound condition of the nervous apparatus, sensation is produced. Chemical stimuli may be placed in the same category. Galvanism and electricity are stimulants to the nervous fibres, which are not mere conductors of the fluid, but are excited as by other agents. This has been taken advantage of by experimental physiologists, to determine the function of particular nerves from its effectiveness and freedom from injury.

The normal stimulants to the organs of sense, which are constructed purposely to receive their impression and to admit the structures to respond to them, and to rightly interpret the communications received, afford another illustration of the direct operation of such agents. Unaccustomed stimuli produce perceptions analogous to those of normal stimuli; thus a blow upon the eye induces flashes of light, and pricking the ear, the effect of sound.

Medicinal agents of a stimulating character produce their effects in the same way. They make their impression upon the peripheral nerves of the part to which they are applied, which is conveyed to the nerve centres, from which irradiations proceed. Thus the application of

[1] Elements of Physiology, by J. Müller, M.D., translated from the German by William Baly, M.D., vol. i. p. 662. London, 1840.

mustard, capsicum, turpentine, ammonia, and similar articles, by inducing excitation in the extreme termination of the nerves of the part to which applied, which is directly transmitted to the brain and spinal marrow, produces reactive effects upon the whole body. Not only is this direct influence of medicinal stimuli exhibited from the external surfaces, but, by a different set of nerves, is evinced in association with internal organs, whereby their sympathies are made evident; thus, stimulating emetics taken into the stomach, or irritating purgatives into the bowels, or acrimonious diuretics into the bladder, call forth the sympathetic movements which anormally or normally are peculiar to the organs affected. Sternutatories afford another instance.

Irrespective of medicinal operation, the teachings of physiology make certain that the functional activity of organs, which must be constantly and uniformly maintained, is preserved by certain stimuli in the organs themselves. Thus the carbonic acid in the lungs most probably calls forth the reflex movements of respiration. The venous blood is the excitant to the movements of the heart, and the chemical, organic, and molecular transformations which take place in the interior of the tissues and with which all action is concerned, probably maintain such movements of the solids, through the intervention of nerve force, as to subserve the purposes of nutrition and secretion. Stimulants then may be said to produce their effects by operating through the *line of cognizance* of the nerve fibrillæ, which hence become excitors and call into activity the sympathies pertaining to excito-motor, the sensori-motor, the nutritive, and even the will.

The mode that has been pointed out for the operation of stimulants is not the only one. The introduction into the circulation and an immediate impression upon the nerve centres are also to be understood, the secondary effect being in compliance with the laws of nerve matter. In this case the influence, being directed from the nerve centres towards the periphery, is in the *line of reflex motor activity.* It is centrifugal as when excited by peripheral stimulation. In the case of stimulants, then, we have presented to us: 1st. Such as without the intervention of absorption act directly on the peripheral excitor nerves, so that their impression, being conveyed centripetally, arouses the nerve centres, and induces resultant centrifugal effects. 2dly. Such as by absorption are carried to the nerve centres, and by centrifugal action arouse the organs and tissues.

There are substances which, operating in the first of these ways, are also operative by the second; thus, carbonate of ammonia, turpentine, and alcohol are locally stimulating, and the excitation induced is transmitted; but introduced into the circulation they are additionally stimulating, and maintain the effects which commenced in local action. There are other substances which require introduction to impress and fortify the nerve centres; thus, opium, ether, and stimulant tonics produce excitement by their absorption, and this applies to all the permanent stimulants, whether acting most conspicuously upon the circulation or upon the nervous system.

But another set of agents must be considered with reference to the nervous system, the opposite to stimulants, for we must equally appeal to the peculiarities of this system to explain the modus operandi of sedative substances.

There can be no doubt that *local sedation* can be produced as well as local stimulation, but with this difference, *that it is not transmitted to the nerve centres.* The first distinct enunciation of the fact just mentioned was made by Fontana, who instituted experiments with the poison of the viper, with ticunas, laurel berries, and opium, and found that general effects were not produced by these and similar poisons, unless they entered the circulation, and that, applied to the nerves, they exerted only a local influence upon them.[1]

That a local anæsthetic effect can be brought about by sedative agents is indisputable. Whytt stated[2] "that since opium, without entering the blood or being carried to the several parts of the body, lessens or destroys their powers of feeling and motion, merely by acting on the extremities of the nerves to which it is applied, it follows that the nerves must be the instruments of sensation and necessary for performing motion." From his experiments, however, he deduced the erroneous idea of a transmitted influence of the sedative effects of the drug along the nerves, as well as by the introduction into the circulation. Since the time of Whytt, numerous experimenters have determined that the application of narcotic or sedative substances destroys the irritability of the heart, and of muscles when separated from the body, sooner than when left to themselves. Humboldt, Philip, and Brodie found that the tincture of opium and an infusion of tobacco paralyze the heart. Müller informs us that to place the local action of narcotic poisons beyond a doubt, he dissected out the ischiatic nerve in a frog for a considerable extent, and let it hang in a solution of acetate of morphia; after a little time he found that the end of the nerve had wholly lost its excitability.[3] The same was the effect of immersing the muscles in a solution of opium; he dissected out the ischiatic nerve in toads, and left the leg connected with the body by this nerve only, which together with the leg was then immersed in a strong watery solution of opium, and in a short time the nerve and muscles lost all susceptibility to the influence of galvanic or chemical stimuli. He further states from his observations that the change produced in nerves by the immediate application of a poison, causing paralysis, is not preceded or accompanied by any signs of excitement, such as muscular twitchings. The application to the nerves themselves in a rabbit, a frog, or a toad of a watery solution of opium, of strychnia, or a spirituous extract of nux vomica, has in his experiments never excited muscular contractions.[4]

In an interesting experiment performed by Emmert, with, however, the design of throwing light upon absorption by the lymphatics, it was found that when prussic acid was applied to a wound in the foot, the abdominal aorta being tied, no effects were produced in 70 hours, yet when the ligature was removed, the animal was poisoned in half an hour. Müller laid bare the ischiatic nerve in toads and removed all the flesh of the thigh, leaving the leg and thigh connected to the trunk by means of the bone and nerve only. He then immersed the leg in a solution of acetate of morphia, and in a concentrated solution of

[1] Fontana. Traité sur le Venim de la Vipère, sur les Poisons Américains, sur le Laurier Cerise, &c. Florence, 1781. Vol. i. pp. 288—318, et passim.
[2] Whytt's Works, p. 490. Edin. 1768.
[3] Op. cit., i. p. 679.
[4] Ibid.

opium, and kept the animals thus for a considerable length of time. No general symptoms of narcotism were produced, even at the end of many hours. Thirty experiments were performed by M. Wernshardt, under his direction, on mammalia, and not the least difference could be perceived in the action of narcotic poisons introduced into the stomach, whether the nervous vagus had been divided on both sides or not.

Direct experiment has determined that sedative effects furthermore do not occur through the nerves by application to their extremities, even when the article employed is most deadly. This fact appears conclusively proved by the researches of Sir Benjamin Brodie, who isolated the sciatic nerve in a rabbit, and included all the parts separated from the nerve by a ligature, when the woorara poison was placed in a wound of the leg and the ligature tightened. No effect was produced through the nerve. This experiment was repeated with the same poison, and sometimes the influence was entirely suspended, if the ligature were permitted to remain a sufficient time.[1] With respect to similar experiments upon the trunks of nerves, those of Fontana may be cited. He isolated the sciatic nerve in rabbits, and caused it to be impregnated with the poison of the serpent by exposing it to the free introduction of the fangs; the animals in all cases lived as long under these circumstances as those in whom the simple operation of preparatory incisions had been made and no poison employed.[2]

The mode in which nervous filaments are impressed is by the suspension or destruction of their excitability; their *vis nervosa* is deadened, and this is a *negative effect.* A familiar illustration is presented in the application of belladonna to the eye, by which the ciliary nerves may be paralyzed and the pupil dilated, but no impression made upon the other eye through the instrumentality of the brain, as when the article is absorbed and affects both eyes. There are other proofs which may be adduced of an analogous nature. The topical application of anodynes and narcotics may be followed by alleviation of pain or irritation in the part without any constitutional result. Aconite is remarkable in this respect. I once accidentally applied some soft extract of this article to my under lip, and found in connection with the sensation of numbness, a loss of sensibility in the half of the lip, so that upon drinking from a tumbler, it felt as if broken upon the margin, there being a distinct line of demarcation between the sensitive and benumbed filaments of nerves. Indeed, a local anæsthetic impression can be made "by destroying locally nervous power," which is *isolated* and confined to the part acted upon. Cold itself is a powerfully depressing agent, and may be so managed topically as to bring a part completely under its depressing effects, and to suspend sensation without the other organs of the economy feeling its influence. In this way it has been proposed and used by surgeons as a substitute for general anæsthetics. The impression of moderate cold, like that of heat, may be stimulating; it may call into operation reflex movements, as those of one hand when the other is immersed in cold water, as described by Dr. Brown-Séquard; or, by arousing the uterus to contraction, may arrest the hemorrhage

[1] Physiological Researches, by Sir Benjamin Brodie. London, 1831, p. 64.
[2] Op. cit., vol. i. p. 173 et seq.

after delivery; but when carried far enough, it is a benumber to the nerves of sensibility and a depressant. After a certain time, when cold has benumbed the peripheral nerves, the slow death from freezing is not a state of suffering.[1]

In pursuing this subject by the aid of illustrations, it is proper to allude to the impression of intense caloric. Instances are recorded where a limb has been burnt off from immersion in molten iron without pain, so instantaneously have the nerves been destroyed, and every surgeon knows that at a white heat the application of the cauterizing iron is not an operation attended with suffering.[2]

With the above facts before us, we are warranted in the assertion that *negative impressions* are not directly communicated to the nerve centres through the instrumentality of the nervous cords which exist between the part affected by them and these centres, for the reason that the peripheral nerve fibrillæ are in a state of paralysis, of suspension of activity, are benumbed and damaged as much as if the nerves were ligated. But further, a negative effect cannot be carried in the line of cognizance of a positive effect, from the exterior to the centre, or in a centripetal direction, which is also that of stimulation.

The negative effect of an agent, which is either brought about by the abstraction of stimuli or by inducing an inability to be affected by them, completely isolates the part from the rest of the body, except it occurs in connection with some commanding organ, whose vital energy is necessary to the entire economy, a point to which attention will be directed hereafter.

The abstraction of the power of transmitting nervous impressions is not confined to the peripheral extremities; it may be produced in a nerve trunk, and thus also be isolated, as shown in the experiments of Müller, where the trunk of the ischiatic nerve, immersed in a solution of morphia, was deadened at the part with which it was brought in contact

[1] Cold is generally regarded as a sedative in its primary impression, but acting as a stimulant in consequence of the reaction that it produces. The first effect of cold applied to a part is to contract the vessels of the part, and a similar effect is produced by heat. Now, we know from experiment that cutting or paralyzing the nerves of the vessels leads to dilatation of them, and that stimulating these nerves induces contraction. If an effect is produced through the instrumentality of reflex action when cold is applied to the hand, as stated by Dr. Brown-Séquard, so as to influence the other hand, we can come to no other conclusion than that the cold acted as a stimulus, so as to bring about contraction of its vessels. If the action of the cold were sedative in the case, there would have been dilatation of the vessels of the hand alone to which applied. A sedative condition of vessels is attended with torpor and engorgement.

The analogy between heat and cold is very close. A moderate degree of heat produces stimulation and reaction, while cold is followed by the same impression. Intense heat exhausts or destroys the excitability, and the same is the case with intense cold. The reaction which follows either applied heat or cold must depend upon the same reactive vital force, and upon the same structural nervous arrangement connected with reflex action. There are two essential features of capillary circulation, contraction and expansion, both of which are impressed by these agents; and although contraction is first produced, it is followed by dilatation, and the play of alternation is sustained between them under normal stimulus. We are led, then, to the inference that what has been taken as the sedative impression of moderate cold is indeed stimulation.

The analogy between heat and cold might be followed out by showing that where reaction is intense from either, the effects are similar.

[2] Cooper, Surg. Dict., art. Burns.

with the narcotic, but above and below was as energetic as previous to the application.

In opposition to the views that have been expressed, no argument can be drawn from the fact that stimulants can produce effects analogous to those that are locally sedative, and that they may be seemingly extended to particular organs, or even to the entire body. The production of stimulation by agents pertaining to the class depends upon the character of the impression. They act upon the excitability, which may gently respond and occasion moderate or even energetic reaction, or they may at once exhaust this excitability. The latter effect may be localized, or if the organ or part in which it is produced has a commanding position in the body, the effects will be perceived in remote organs. An illustration may be derived from the results of high steam applied to the cutaneous surface: the entire nervous cuticular distribution being paralyzed, there is no pain or sensibility, and instances are recorded where individuals have walked for some time afterwards, finally to sink from prostration and secondary congestions.

The condition of things presented where vitality has been lost in an internal organ in consequence of inflammation, where there is no pain, and for a time the individual has the power of locomotion, but ultimately sinks, may be further cited. The functional and organic movements of an organ may be necessary for the reaction upon other organs, and the mere abstraction of such stimulus may be followed by depression.

But there is another view to be taken of the intense impression of stimulants. Not only in the organ or part where the effect is primarily produced may the excitability be deadened, but this inordinate stimulation, extending through the nerves to the nerve centres, may induce a similar condition of exhausted excitability and consequent collapse. Among the experiments of Sir Benjamin Brodie, are some where pure alcohol was introduced into the stomach. In two cases, the one of a cat, the other of a rabbit, insensibility was immediately produced; in two other cases rapid apparent death.[1] Cases are narrated where, in consequence of large quantities of ardent spirits being introduced into the stomach, sudden death was the consequence. In these cases we have exhibited a result similar to that from mechanical injury, as a blow upon the stomach or upon the testicle. The rapid introduction of cold water into the stomach of drunkards may be followed by prostration and death.[2] These are examples of intense over-excitement and exhaustion of nervous excitability in the stomach, or elsewhere, propagated in the usual way to the nervous system, and involving it in that general state which is known as a *shock*. The phenomena of depression constituting this shock may, however, proceed from two causes; the one that to which reference has just been made, the other, as was before mentioned, the abstraction of relative influence of an important organ. The prostration which accompanies the intense impression of acro-narcotic agents may be explained upon both these hypotheses. In this con-

[1] Physiological Researches, by Sir Benjamin Brodie, London, 1861, p. 39, &c.

[2] The inordinate stimulation of electricity may be followed by local exhaustion, as has been shown in conducting experiments, where from this cause repose has been made necessary to allow of a renewal of the excitability; or an overwhelming direct exhaustive effect may be followed by death.

nection it may be apposite to allude to some experiments of Dr. B. Séquard, which he informs us show positively that a sudden excitation of the abdominal sympathetic nerve kills, or if not, diminishes the movements of the heart, yet a section of the par vagum, of the spinal cord, or the splanchnic nerves, allows any kind of irritation to be made on the abdominal sympathetic without impediment to the heart.[1] The cases of paralysis originating in irritations of sensitive nerves, and which evince defailance of motor power as well as loss of sensibility, in consequence of excitation inordinately expending itself upon the nerve centres, come into the same category as the instances mentioned of exhausted excitability. Many of such cases are hysteroid. Reflex action is stated to be the cause of the phenomena here alluded to. Although contraction of the vessels in the spinal marrow may be induced in that way, and the circulation of blood be impeded, so as to give rise to diminution of functional energy and loss of power, still the explanation founded upon exhausted excitability is not invalidated.

Having endeavored to show, by the evidence that has been presented, that sedative substances do not act upon the general system through the instrumentality of the nerves, to whose terminations they are applied, the conclusion is inevitable that they operate by reaching the brain and spinal marrow or ganglions by means of the circulation. This involves the discussion of the proof that substances enter the circulation by absorption, into which we cannot now enter. It may in this place, however, be remarked that the experiments which establish this fact are perfectly conclusive.

Attempts have been made from time to time to explain the *peculiar mode* of impressing the nerves or the nerve centres by medicinal agents, and different hypotheses have been advocated. By Dr. Headland, the old mechanical idea of atoms is discussed, but dismissed with the remark that it is "purely conjectural and fictitious." A chemical hypothesis is equally unsatisfactory, and we are forced to the inference that the process, involving as it does apparently vital actions, is in character vital or dynamical. That molecular disturbance occurs is highly probable, but its exact nature is a mystery. It is only through the medium of the phenomena that are exhibited after the administration of these substances that we can gain a correct idea of the influence they exert over the functions of organs, and the organic actions which take place in them. It is with reference to these that medicinal agents must be investigated.

From what has been stated with respect to nerve action, it is understood that medicines which are stimulating in their impression, act either on the sensitive peripheral extremities of the nerves, the stimulation there produced being communicated to the nervous centres, whence it is irradiated; or by entering the circulation directly impress the nerve centres and arouse the functional and organic movements through the reflex apparatus of nervous distribution which commands and controls the operations of organs. In these two ways the sympathies and their nervous dependence can be brought into relief and demonstrated to exist. There are many articles that commence their

[1] Course of Lectures on the Physiology and Pathology of the Central Nervous System. Phil., 1860, p. 159.

effect by the first of these modes, and maintain it by the second, a double method of impressing the system being thus possessed by them; thus, ammonia, alcohol, turpentine, the articles pertaining to the class of aromatics, and substances containing volatile oils, &c., induce phenomena of excitation, first by a local action, and continue to maintain or even augment this activity when absorption has occurred.

But phenomena the opposite of those just specified are of equal importance, and here demand a close consideration. As the nervous system, in one sense, must be regarded as a unit, and is governed by its own laws, in accordance with which every agency which conduces to its regular or irregular activity must operate, it follows that the condition the opposite of activity, or the state of sedation, must be brought about in obedience to the same laws. A state of sedation is but the abstraction of activity, and this, as has been shown, is not produced by medicinal articles, by an impression upon the periphery of the nervous system communicated to the centres. It may, as has been stated, be local and isolated, but in this way cannot be general. The ganglionic centres must be impressed directly, and this by the absorption and conveyance of the sedative agent.

It has been supposed that an argument is afforded in favor of the direct action of sedative medicines upon the nerves and of its transmittal by them, from the fact that the nearer an impression can be made to a painful part or organ, the more decided and speedy will be the relief afforded. For many reasons there is a choice to be made of the part to which medication is to be applied; but it cannot be said that greater relief can be secured by directing medication to a part in the proximity of the affected one if it be beyond the reach of the obtunding influence brought to bear upon that part. To present any advantages the sedative must locally impress not only the nerves of the tissues to which applied, but also directly the nerves of the adjacent painful organ, and this may be done by impressing a plexus, which is the common source of nervous supply, or perhaps by modifying reflex sensibility. If by absorption the sedative agent pass by the disordered organ, relief must come from the central masses, as when it is given by the stomach or by any other remote organ.

The phenomena of sedation are essentially *negative;* they are due to functional and organic actions in a state of arrest. When induced by stimulation they are owing to exhaustion of excitability in the nerve centres, but in the case of direct sedatives are the result of an overwhelming impression made upon the seat and origin of nervous power, the central ganglia. In either case the secondary resultant phenomena connected with the organs, be they functional or organic, are produced by the want of their due and accustomed supply of nervous influence, or in other words, there is the deficit occasioned of that nervous regulating and maintaining force on which these movements depend. It must be noted, however, in this connection, that irrespective of the abstraction of the power of generating and irradiating nervous influence, there is a benumbed condition of the nervous centres, which renders them insusceptible to impressions, whether normal and within the economy, or artificial and produced by unusual agents. This reason further accounts for many phenomena observed in a state of sedation. In illustration of the views that have been enumerated, we shall first

refer to the phenomena occasioned by the administration of narcotics, which, in common with other classes acting upon the nervous system, must be studied with reference to the sympathies and the control which nervous action possesses over functional and organic movements.

LECTURE II.

THE primary impression of narcotics is that of stimulation, induced not from local action but from their introduction into the circulation. A small quantity is more exciting than a large amount, which more speedily and certainly induces the characteristic effects of narcotism. The manifestations of excitement are the same as those from other stimulating articles. To comprehend the phenomena of narcotism, reference must be had to the exposition of the sympathies that has been given. From the first occurrence of dulness to the full production of sleep, the voluntary movements are sluggish, and when stupor has been produced, the will sympathy is completely obliterated, the senses are not rationally cognizant of impressions, and oppression takes possession of the intellect. The nervous centres are obtunded, sensibility is benumbed, and motor power interrupted; the ordinary impression of external stimulants does not arouse the one or the other; the anæsthetic state is clearly manifested. In this condition animal life may indeed be said to be suspended, and the individual is converted into a living automaton, with sole manifestations of internuncial capability in the organs necessary to life, while the organic processes are languidly accomplished. If we examine the phenomena connected with the organic functions and actions, it will be found that they are to be explained by the deficiency of nervous force. Not only is there diminished power in the centres of receiving impressions from the periphery, but excitant and motor power for irradiation into the organs and tissues is not freely generated, and the excitability of the nervous cords themselves is reduced, which is felt in the intimate structure of the organs. There are exhibited, lethargy in the movements of the heart and lungs, lentor or stasis of the capillary circulation, turgescence of the vessels, diminution of the secretions, and a check is given to nutrition both primary and secondary, while the ordinary wants of the economy are unheeded—indeed, not felt. These effects may be happily employed by the skilful practitioner in combating disease.

When, however, the impression of narcotics is intense, there is induced so great exhaustion of nervous force as to impair materially the vital processes; sinking may occur, perhaps from the inability to maintain them; from a state of diminished activity there may be the transition to one of entire cessation of them, and death become inevitable, with secondary congestion of the heart and lungs, which functionally affects the brain to a further extent than the original narcotic impression. Exhaustion is a result under any circumstances of the decided impression of

this class of articles; and it is exhibited prominently in the condition which follows their use when employed therapeutically.

It is apparent, in all the symptoms adverted to, that they are due to the want of the usual nervous activity communicated to or existing in organs whose operations have been suspended or overwhelmed; they are the results of an interference with it, and are not active phenomena, but, on the contrary, are *passive* in their nature and essence, and may be considered as much of a negative character as those induced by the local action of the same articles. All of the phenomena, produced in the way that has been exhibited, pertain equally to the sympathies enumerated with those induced by stimulants, which bring the sympathies into active operation.

The truth of the deductions that have been made is borne out by experiment and observation. Narcotics are similar to mechanical agents brought to bear either upon the whole or upon parts of the nervous system; thus, compression of the brain induces a species of narcotism; the will is obliterated, the excito-motor and sensori-motor reflex actions are suspended; even nutrition may be interfered with and modified from mechanical interruption of nerve action. That nutrition is affected by the destruction of a ganglionic nerve of sensibility and excito-motor property was proved by the experiments of Magendie upon the trifacial. In twenty-four hours after the section within the cranium, the cornea commenced to become opaque; it finally became as white as alabaster. In another experiment, from the second day, the conjunctiva became red, appeared to be inflamed, and secreted a puriform lactescent matter abundantly. In another instance the iris became red, was inflamed, and formed false membranes. Section of the branch of the fifth pair furnished to the lachrymal gland produced suppression of the secretion.[1] In paralysis of the fifth nerve similar results have been observed by Abercrombie. By Bernard and Brown-Séquard it was determined that the division of the sympathetic in the neck, or the destruction of the cervical ganglia is followed by dilatation of the bloodvessels, injection of the conjunctiva and of the ear, an elevation of temperature, increased secretion of cerumen and of tears, and in the experiments of Magendie, the whole nutrition of the eye was changed, leading to its destruction.

In proof that there exists sympathetic organic reflex action in connection with the organic movements and the nutritive acts connected with them, reference may be made to the increased secretion of saliva, of bile, of pancreatic fluid, by the application of stimulants to the ducts of the organs by which secreted, to the secretion of milk in the nursing female by excitation of the nipple, and the flow of gastric juice in the stomach by the presence of food. These may be adduced as nutritive sympathies, and it may be stated that they are inseparable from cell action, yet the cell action is supplied by the areolar circulation, which again is provided with nervous fibrillæ. As an illustration of the control possessed by the nervous system over the secretory acts which depend upon nutrition, reference may be made to the effect of emotions upon the production of milk, and also of other secretions. It is a well-known fact that the secretion of milk is diminished under the free use of nar-

[1] Leçons sur les Fonctions et les Maladies du Système Nerveux, par M. Magendie. Paris, 1843, II, 36.

cotics internally, or by their local application to the breasts. In the vegetative processes, physical or even vital laws may account for the changes and chemical combinations connected with nutrition, but in the higher animal organization the nervous system plays so important and necessary a part that its operations must be recognized.

The influence of nerve excitement upon secretion and changes of the blood in glands has been beautifully illustrated by experiments of Bernard. He had noticed that the venous blood of the kidneys, which during the *non-secretion* of urine, or repose of the organ, is of a *black* color (while the color of the whole organ is bluish), became of a *bright red* color during the secretion, promoted by the introduction of a catheter into the ureter, and that the kidney assumed a similar hue. This led him to select a gland secreting a special fluid, most convenient for experiment; this was the submaxillary. In the state of repose, the blood returned from this gland was found of as *deep* color as the venous blood can be, the functional action of the salivary glands being intermittent. When the secretion of saliva was promoted by the introduction of a little vinegar into the mouth, the color of the blood in the return vein became of a *red arterial* color, and as the function ceased to be performed, slowly became dark. To determine how far this change was dependent upon nervous action, the branch of the *lingual nerve* distributed to the gland was isolated, and a tube placed in the duct. When the nerve was galvanized, the secretion was brought on, and with it the red coloration of the blood in the vein. When the galvanic stimulation ceased, the secretion was suspended, and the blood became dark. When the *nerve was tied*, the blood was *dark, and secretion suspended*, but when the nerve was galvanized, the red color of the blood appeared with the production of secretion. When, in another experiment, the filament of the sympathetic (accompanying the artery) was tied, the venous blood of the gland became *red and ran more freely*, and the salivary secretion was suspended; the filament was then galvanized, when the blood became black, ran less freely, and terminated by stopping entirely. The animal being allowed to repose, the blood of the gland became red again.

The filament of the lingual nerve being now tied and galvanized, the saliva ran in a stream, the venous blood preserved the same red color, but it ran in greater quantity and in jets synchronous with the pulse.

The two filaments, one of the lingual, the other of the sympathetic, being tied, and the filament of the first being galvanized, the saliva ran abundantly, and the red venous blood was thrown in jets.

The branch of the lingual, although in connection a part of the distance with the lingual branch of the fifth pair, is in reality a filament of the seventh pair (portio dura). Now by cutting this nerve, and then endeavoring to stimulate the secretion of the gland by vinegar, no secretion appears, and no change in the blood from black to red, both of which can be induced by galvanism, a fact which shows that the red color of the venous blood of the submaxillary gland is dependent on the activity of the tympanico-lingual nerve, and that its black color is on the contrary related to its physiological inactivity. But this black color of the blood does not depend upon mere paralysis of the nerve just mentioned; it is due to the state of activity of another nerve which operates positively by rendering the blood black, and which,

permanent in its operation, is antagonistic to the lingual, whose action is intermittent. This other nerve is the arterial branch of the sympathetic, and when the gland is in a state of repose, or of non-secretion, its power preponderates, whereas if cut and its power suspended, or the energy of the lingual branch aroused, the blood is rendered red in color. The active function of the sympathetic would seem then to be to render the blood black. The explanation that is given of these phenomena is based upon the secondary mechanical effects upon the circulation induced by the nerves in question. It is assumed that the branch of the seventh pair has the power of inducing expansion of the capillary vessels, and of thus permitting a full flow of blood through them, which indeed under stimulation of it is more rapid; hence, when its function is interfered with, the blood arrested in the gland becomes dark, or, its free course through the gland being impeded, it loses the arterial character pertaining to the supply. As secretion is dependent upon free circulation, it is also interrupted. On the other hand, the office of the sympathetic is to produce contraction of the capillaries and to retard the blood, which, in proportion to the retention, becomes darker, while the function of the organ reposes. When the nerve is stimulated and rendered inordinately active, the darkest color is produced; but when the continuity of this nerve is interrupted, contraction is prevented, the blood has fuller sweep through the vessels, and the same phenomena are presented as if the lingual branch were inordinately stimulated. In fact, the blood becomes red or black in proportion to the activity of the circulation, which is owing to the dilatation or contraction of the vessels. An inverse activity of the two nerves is thus demonstrated, or an antagonism of action, and the results are dependent upon the preponderance of one or the other. In this way the intermittence of functional action is accounted for, as the activity of the secretory process is brought about by reflex action. It is apparent, nevertheless, that the reflex nerve is an ordinary motor nerve (the 7th), and it is reasonable to infer that the incident is not the sympathetic, but probably a portion of the 5th nerve, which is one of sensibility. Secretion then is influenced by the nervous system, but otherwise than solely by the sympathetic.

In proof that the activity of the two sets of nerves experimented upon modify the glandular secretion, it is stated by Bernard that, although the expulsion of the saliva corresponds, in a general way, to the excitation of the tympanico-lingual, and a state of repose with that of the sympathetic nerve, yet the excitation of the two series causes a flow of the secretion, which is more fluid when the first is under excitation and exceedingly viscid when left to the influence of the second. Especially is this phenomenon manifested *when all the nerves of the gland are divided, and the ends in connection with it are galvanized.*

With regard to a change of the blood in the two conditions of glands of activity or of repose, it was determined by the same experimenter that the red venous blood of the kidney remained more diffluent, and sometimes exhibited no clot, and that of the submaxillary gland contained less fibrine than arterial blood. It became black spontaneously when drawn from the vessels. Experimenting to determine if the blood was deprived of oxygen in its transit through the gland, he found that this same red venous blood had nearly the same amount as arterial, while the venous black blood was largely deprived of its oxygen. From this it would

appear to be a fair deduction that the chemical changes in this respect are connected with nervous activity.

It has been remarked by M. Bernard, "that the special nervous system which animates each capillary system and each organic tissue, in each part, regulates the course of the blood in accordance with the especial chemical functional conditions of the organs. These nervous modifications of the capillary circulation are made in the part or organ, and without any perturbation of the circulation of neighboring organs. Every part is united to the whole by the conditions, which are common, of the general circulation, and at the same time by means of the nervous system every part can have its own circulation and physiological individuality."

It is not essential to our purpose to further pursue this interesting subject. The summary of investigations and results that has been presented clearly establishes the dependence of capillary action and of secretory function upon the nervous system. It is also apparent that the so-called sympathetic or ganglionic system is not independent, but is aided in its operations by the general system of nerves, so as not to admit of a separation from them in its especial office. It is governed, as far as known, by the same laws as those to which they are obedient. It is in perfect unison with nerves that can call it into activity and promote its effectiveness, whether of excitor power, of sensibility, or of motion. *Excito-nutritive sympathy* and functional organic *movement* depend upon their joint and harmonious operation. All late investigations tend to prove the truth of what is now advanced, and with this exposition we have a clearer insight into the effects of narcotic articles upon the nutritive processes.

If narcotics, when pushed to the extent of sedation, suspend sensibility and motor power in the nerves pertaining to the system of animal life, they produce a similar effect in those upon which organic life depends.

If reflex action connected with the former is interfered with or diminished by their use, it is in the same way affected in connection with the nutritive processes. If in the one case the relations with the exterior world are either temporarily or permanently obliterated, a paralysis of the nerves governing the interior actions modifies the internal life, and presents it for examination under new aspects. A compound arrangement of nerves has been shown by Bernard to govern secretion and capillary circulation, and it is by suppressing the power jointly of these nerves that the passive result of non-secretion and circulatory stasis is entailed. By affecting the source of power in the centres, or by lessening excitability, and consequently functional activity at the periphery, exactly the same results are locally accomplished. The effect of partially suppressing the nerve influence upon which capillary circulation depends is shown in the experiment of cutting a cervical filament of the sympathetic, which leads to great *vascular turgescence* of the ear and the side of the face, *the arteries beat more forcibly, circulation is more active*, animal temperature is raised, and absorption of toxic or other substances more rapid.[1] To produce the static condition requires

[1] Bernard, Leçons sur la Physiologie et la Pathologie du Système Nerveux, t. ii. p. 505.

the total suspension of nervous action, and passive results, the opposite of these active phenomena, are the consequence. It has been determined that congestion from impeded circulation occasions a lowering of the temperature, and stasis of the circulation interferes with endosmotic action.

There are peculiarities of impression upon different organs to be found in the operation of narcotics, which would lead to the belief that their mode of action is very diverse. The disparity to be noticed does not, however, contravene the facts and the conclusions from them that have been arrived at; they are not in opposition to the views that have been presented.

A difference which is very obvious is with respect to the modification of the pupil exhibited under the administration of narcotics; thus, opium contracts the pupil, while belladonna dilates it, which latter property pertains to a greater or less extent to other articles. To comprehend these phenomena the anatomical structure and function of the iris must be adverted to. It is a compound muscle, constituted of circular and radiating striæ, which antagonize each other. The radiating striæ dilate, while the circular striæ, by contraction, contract the pupil. For the purpose of dilatation and contraction deduction would lead to the belief that these antagonizing striæ are supplied by distinct motor nerves, and experiment places the fact beyond question irrespective of the researches of anatomy. That contraction of the pupil is produced by a section of the sympathetic in the neck was announced as far back as 1727 by Parfour du Petit.[1] It has been confirmed by all experimenters who have since, and more particularly of late years, operated upon this nerve. But further, by M. Boffi, of Milan, it was found that when the end of the cut nerve was galvanized, the pupil dilated. Near the same period it was noticed by Ruete, of Vienna, that in paralysis of the third nerve the pupil was dilated, and could still further become so by belladonna. The inference from these facts is that the sympathetic controls the radiating, while the third nerve influences the circular fibres. The power which governs the active dilatation, or rather influences the radiating striæ, was found to reside in the spinal cord by Budge and Waller, who limited this region, called by them *cilio-spinal*, to the space between the last cervical and sixth dorsal vertebræ. Recent experiments by Brown-Séquard have given to it greater limits. The third nerve can be traced to the motor tract of the crus cerebri.

The above statements throw some light upon the difference between opium and belladonna with respect to the eye. If the abstraction of nervous influence through the sympathetic causes contraction of the pupil, it follows that such is a result of the depressing action of opium, and if paralysis of the third nerve induces dilatation, it is as much a correct inference that belladonna causes paralysis. It cannot be supposed that the effects alluded to are caused by stimulation to the nerves, admitting of a reverse explanation to the one that has been given. In its most intense impression, when belladonna has obliterated nervous force, the dilatation of the pupil is a fixed condition, and opium, when

[1] Mémoires de l'Académie des Sciences, from 1727. See Bernard, op. cit., 472.

expending its full effects, producing the profoundest narcotism, as decidedly induces dilatation as other narcotics. In the case of opium there is a gradual invasion of the nervous centres, equally to be noticed, as where the active principle of belladonna, atropia, or its salts are the subjects of observation. With respect to these, M. Mechea[1] has remarked, "they depress or tend to abolish the functions of the different parts of the system successively and not simultaneously."

The comparative study of the effects of narcotics leads to the belief that, like articles of the materia medica generally with reference to the organs, they have, with respect to portions of the nervous system, an elective affinity. This is in accordance with the views of Flourens.

Again, disparity of operation is exhibited in the effects upon the bowels. While opium constipates them, the same result does not follow upon the exhibition of some other articles of the same class. The control over peristaltic movement and free secretion is certainly due to the suspension of reflex influence over muscular contraction, and to the diminution of capillary activity. Negative or passive effects are brought about, and there can only be perceived, in the phenomena mentioned, a greater tendency in opium to impress the spinal column and the nerves afforded by it to the complicated sympathetic arrangement which governs the functions of the bowels, than is possessed by its congeners. Under circumstances of inordinate activity of reflex nerve action, inducing spasm and pain in the bowels, the free employment of opium, by its sedative action, is the most certain and speedy remedy. Upon the same principle is treated the constipation which gives rise to colic.

But one other instance will be alluded to of this elective tendency among powerful depressing agents, and that is the impression upon the medulla oblongata by chloroform. To the most striking extent it is possessed by this article, but it is also evinced by conium. The almost instantaneous death which follows an over-dose of both of these drugs can be explained upon no other ground than the exhaustion of all nerve excito-reflex power at the point that has been stated. This branch of the subject of the operation of medicines by means of the nervous system might be extended, but it involves the details connected with the peculiar properties of each article that has been investigated. It may be remarked that the more we become acquainted with the especial qualities of individual substances, the more apparent does it become that their effects are in accordance with the principles which have been exhibited.

In connection with the discussion of the operation of sedative agents, it is necessary to advert to a class which differ from narcotics in not so much impressing the brain, or obtunding the nerve centres, as in exerting a general prostrating effect upon all portions of the nervous system. It is to be recollected that the vis nervosa—the excitability of this system—is resident in every portion of it, and that if an impression be made that diminishes such excitability in the organs, their functions must be carried on less vigorously. Direct experiment has determined that parts are obtunded—deprived of excitability, sensibility, and mobility by the local application of such substances as

[1] Am. Journ. Med. Sciences, April, 1863, p. 444. Bouchardat, Annuaire for 1862.

aconite, tobacco, and prussic acid. Should these be introduced into the system through the instrumentality of the bloodvessels so as to be brought in sufficient quantity in contact with the ultimate structures, the result is a total suspension of all the nervous and organic actions; an anæsthesia is produced, which is not local nor partial, as regards the sympathy between parts, but profound and universal, deadly in proportion to the intensity of the blow which strikes at the root of *vital existence in the organism.*

There are substances which, although not coming under the head of medicines, are analogous in their operation to narcotics and sedatives; they are derived from the animal kingdom, or from so-far unknown sources. A reference to these will not be irrelevant, as the researches instituted to ascertain their exact mode of destruction of life may be made to bear upon the present subject. No poison has been more experimented with than the woorara, and the results of the numerous eminent investigators, who have elaborately reported their observations, are so similar as to lead to no question as regards its properties. It is a stupefier, obliterating sensibility and motion in proportion to the intensity of its impression; like opium, acting more decidedly upon the relations of animal life than upon those of organic life. Its power is primarily expended upon the nerve centres; and of the organic functions necessary to life that of the heart is the last to succumb. The venom of the serpent is similar in its mode of operating.

There are other articles which are different; they seem to be most energetic in the destruction of nervous excitability and muscular irritability, and to induce death by stopping the motions of the heart. They resemble tobacco, aconite, and prussic acid. To two of such substances allusion may be made, as they have been investigated by Drs. Hammond and Mitchell, whose results are interesting.[1] The articles are caraval and vao, two varieties of the poison of the South American Indians. It was found that the motion of the heart was primarily checked from the introduction into the circulation of these substances; that there followed upon it paralysis of the limbs and loss of voluntary motion, but reflex action remaining for some little time afterwards. There was no doubt in the minds of the observers that a powerful influence was exerted upon the muscular structure of the heart, and that a sedative and paralyzing effect was produced, not on the brain and spinal marrow, but upon the nervous cords and fibrillæ. Varied trials showed that the excitability connected with reflex movement remained after entrance of the poison into the general circulation, but weakened to considerable extent, which could be awakened by galvanism to the nerves or by direct stimulus. By preventing the agents from entering a limb, its full excitability was maintained. It may be argued with respect to like poisons that as the deadening of the heart takes place in a short period, it affords evidence of the capability of the poison to forcibly act upon the muscular tissue, and that while entering the heart and being distributed through its interstitial structure, a certain amount is carried to the brain and spinal marrow and also to the remote muscles. But as the heart ceases to act so speedily, the full dose cannot be

[1] American Journal of Medical Sciences. July, 1859.

driven into other organs and portions of the body, and consequently entire loss of vitality is delayed until the complete effects of deprivation of blood, or its perversion, as is manifest in these cases, is felt in every tissue. It cannot be supposed that any one set of muscles can be more amenable to deadly agents than another; there is nothing in their anatomical conformation that would warrant the conclusion; and with respect to their nervous supply, such a separate and independent system as the sympathetic having no existence, the motor power wherever found is certainly identical, and the same may be stated of excitability. The heart differs not in its vital properties from other muscular structures, and were the experiment made of separately contaminating the blood of a limb, there can be no doubt that the irritability of the muscular tissue of which it is formed would be as profoundly destroyed as that of the heart, which is the first muscular structure to receive the sedative poison.

In the examples that are furnished of destruction of nervous excitability and muscular irritability, the question arises with reference to an independence of each other. From this sprung the controversy that has existed since the time of Haller, and which even in another form prevailed at an earlier period.[1] We purpose not to enter into it, but may simply state that it is one mainly of pure abstraction. It will be admitted that as muscular structure is excited and controlled by nervous action, there must be the most intimate association between the nervous structure and the muscular to which it is distributed, and the belief may be entertained that they are functionally inseparable. Upon this very point we have the pertinent remarks of Müller,[2] that "nerves immersed for a short time in a solution of opium lose their susceptibility of stimuli to the extent to which the fluid has acted upon them, while between this part and the muscle they retain their property of exciting muscular contractions under the influence of stimuli. Muscle also immersed in a solution of opium loses its vital properties to the extent to which the contact with the poison has reached. This similarity of action of narcotics on nerves and muscles renders it probable that the effect of such substances in making muscles to which they are applied insensible to the influence of stimuli, is owing to their destroying the excitability of the nervous filaments distributed in the muscular substance." We are inclined to the opinion that the paralysis of the nerves in the interstices of the muscular structures is, *de facto*, a paralysis of muscular structure itself.

Sedatives may have a more determinate tendency to act upon one portion of the nervous system than another. They may affect the brain or the spinal marrow, or they may exercise a general depressing effect upon nervous distribution by suspending the vital properties of the

[1] The arguments in favor of muscular irritability being independent of nervous structure and its excitability are lucidly given by Dr. Carpenter in his "Principles of Human Physiology," and as clear an exposition of the opposite view has been presented by Müller in his "Elements of Physiology," vol. ii. Virchow, in accordance with his doctrine of cell action, is a strong supporter of this independence, indeed, not only with reference to the muscular tissue, but of all the tissues.

[2] Op. cit., vol. ii. p. 699.

nervous trunks and minutest filaments—thus exhibiting varied phenomena with reference to the sympathies and organic movements, as has been shown by numerous inquirers; but they act in the same manner, for the same reason that has been given in the instance of stimulants by Müller, "because that on which they act possesses but one kind of excitable force, and because they themselves act here by virtue of the same quality," that of sedatives.[1]

An analogy in operation exists between certain mephitic gases and the class of articles that has been noticed; they destroy vitality by acting on the blood and rendering it deleterious, either by simply displacing oxygen, or by destruction of the vitality of the corpuscles. Under these conditions of the fluid the nervous power cannot be maintained. It is probable that certain of them, as carbonic acid, possess a definite capability of impressing the nervous system. Nitrous oxide is a powerful stimulant in this way.

Not only is the elective tendency manifested in the case of sedatives, but it is shown when stimulants are employed. The notable instances that may be cited are, of strychnia upon the spinal marrow giving rise to motor excitation generally, and of ergot which more especially expends its power upon the uterus. As much may muscular irritability be exhausted by articles called tetanics, as by the most deadly sedative, and as there is no doubt of their influence being expended upon the nerves, an inference may be drawn against the independence mentioned.

The doctrine of independent cell action connected with vital force existing in parts in which no nerves exist, so cogently enforced by Virchow,[2] we conceive not to invalidate the facts and reasoning that have been presented. This vital force may be impressed by stimuli, so as to give rise to metamorphosis of tissue, and chemico-vital modifications in the interstices of the tissues. As in vegetable organizations slow changes and alteration of growth may result from physical agencies, so in animal many morbid deposits or alterations may be induced. It cannot be denied that morphological productions can as well occur in the living animal tissues as the formation of a gall-nut from vegetable organic elements. Stimulants may excite, while sedatives may repress such tendencies.

The conclusions at which we have arrived from this extended exposition are the following:—

1. Medicines acting upon the nerves are either *stimulants* or *sedatives*.

2. They produce their effects either by directly acting upon the nerves, or through the intervention of the circulation.

3. *Stimulants* impress the peripheral extremities of the nerves, inducing an excitation that is transmitted to the nerve centres in the line of cognizance of impressions, and produces reflex movements of excitation in the part acted on or in other parts and organs of the economy; or they are introduced into the circulation so as to affect the nerve centres and the nervous trunks and fibrillæ, thus operating on the organs and tissues.

4. *Sedative agents* are capable of paralyzing the extreme peripheral ramifications of the nerves, or the nerve trunks, with which they are brought in contact; but this impression is not transmitted by the nerves

[1] See ante, p. 214.

[2] Cellular Pathology as based upon Physiological and Pathological Histology. Lect. XIV. Reprinted Phila. 1863.

to the nerve centres, and induces no remote, general effects. It is necessary, that, to produce an effect upon the organs generally, they should be absorbed and carried to the nerve centres, or to the nervous structure distributed to the organs, the power of which is depressed or paralyzed.

5. The effects of stimulants are in their nature *active*, inducing rapidity and greater vigor in the functions of animal or organic life, while those produced by *sedatives* are *passive*, and are owing to the abstraction of nervous influence in the organs and tissues, whereby their functions and movements are suppressed.

6. We are ignorant of the exact reason of the dynamical influence that is exerted upon the nerves and nerve centres, be the phenomena exhibited those of excitation or of depression.

LECTURE III.

HAVING shown that the operation of medicines through the instrumentality of the nervous system takes place in particular modes, which are entirely dependent upon the source and nature of nervous action, and having assumed as a fact that there is an introduction of medicinal substances into the circulation in order to account for some of the effects due subsequently to nervous influence, it becomes proper to present the evidence that absorption does actually occur, and that it is preliminary to the production of numerous phenomena resulting from the administration of remedial articles.

The first point to be settled is, are medicines absorbed so as to enter the circulation, and be brought directly in contact with the organs and tissues? If we are not able to establish this point, it becomes a difficult task to explain how substances can induce marked and especial effects upon organs which are in the interior of the body, and which cannot be accounted for in any other manner.

There are two modes of proof that substances enter the circulation, which in the first instance may be adduced as conclusive. The one is derived from the manner in which experiments are performed which admit of no other explanation; and the other consists in the fact of the detection of articles when taken into the circulation in different portions of the body, in the blood, and in the secretions.

With reference to the proof from the way of performing experiments, it may be stated that Delille and Magendie divided all the parts of the thigh of a dog except the crural artery and vein, leaving merely these vessels, which were dissected clean, and freed from their cellular coat, to maintain the connection of the limb with the trunk. Two grains of Upas tienta were then inserted into a wound in the foot. The symptoms showed themselves in four minutes, and in ten the animal was dead.

Another experiment was to lay bare one of the jugular veins of a young dog; being isolated from the surrounding parts its whole length, and a card being placed beneath it, Magendie applied freely a watery solution of the alcoholic extract of nux vomica. The symptoms of poisoning appeared before the expiration of the fourth minute. When a similar experiment was made upon an adult dog, the symptoms occurred in ten minutes.[1]

The experiments of Sir B. Brodie have been cited, showing that the woorara poison produced no effects when the nerves were entire, yet the circulation impeded. See page 217.

The opposite of these was performed by him with a different result. He exposed the axilla of a rabbit, and divided the spinal nerves supplying the upper extremity just before they unite to form the axillary plexus. He not only divided every nervous filament, however small, that he could detect, but every portion of cellular membrane in the axilla, so that the artery and vein were left isolated. He then made two wounds in the forearm, and inserted into them some of the woorara formed into paste. Fourteen minutes after the poison was applied, the hind legs became paralytic, and in ten minutes more the animal died.[2]

The next method of proof that substances enter the circulation is by detecting them in the organs, in the blood, and in the secretions. There is no want of testimony to substantiate facts of the kind mentioned.

Meyer injected a solution of the prussiate (ferrocyanide of potassium) of potassa into the lungs, and in from two to five minutes the salt could be detected in the blood by the coloration produced when the chloride or sulphate of iron was added. It has been found also in the skin, in the fluid of the articular cavities, in the abdominal cavity, in the pleura, in the pericardium, in the fat, in the fibrous membranes, as, for instance, the dura mater, the capsular and lateral ligaments of joints. The kidneys were the only glands in which it could be decidedly detected, there being an elimination of the salt; yet traces could be found in the liver and in the testes and salivary glands.[3]

Mr. Key introduced some powdered prussiate of potassa into a wound on the inside of the leg of a donkey. In six hours the animal was killed, and the salt was detected in the blood of the femoral vein and in the mesenteric veins. Orfila detected arsenious and arsenic acids, the arsenites, tartarized antimony, iodine, potassa, baryta and its salts, the mineral acids, and the soluble salts of copper, lead, mercury, gold, and silver in the blood, and this, whether introduced into the stomach or applied externally. By the same eminent observer, copper and arsenic have been found in the viscera of animals.[4]

The experiments of Tiedemann and Gmelin are conclusive upon this subject. They cover considerable ground, and will be cited again when we come to speak of the routes by which substances are introduced.

Wöhler and Stehberger have presented a full list of articles which are eliminated by the kidneys, some of which are unchanged, while others

[1] Magendie, Elements of Physiology, trans. by Milligan, p. 314, 4th. ed. Müller, Elements of Phys., Baly, vol. i. p. 254.

[2] Op. cit., p. 64. Exper. xxv.

[3] Müller, Elem. of Phys., i. 259.

[4] Toxicologie.

are decomposed, but have sufficiency of the basic principle to identify them. Salines, coloring and odorous principles comprise those which are unchanged, while the salts of the vegetable acids, sulphuret of potassium and ferridcyanide of potassium, are substances that undergo decomposition, and assume new chemical forms. Sulphur and iodine assume new forms, as do several of the vegetable acids.[1]

Mr. Kramer, of Milan, detected the nitrate of potassa in the blood and urine, the iodide of potassium, as well as other substances in the blood, urine, and chyle.

In the milk, a considerable number of substances have been recognized, either by their sensible or chemical properties, or their physiological effects, as stated by Pereira. An interesting fact fell under the observation of Dr. Taylor. A cow had swallowed a quantity of white paint, when several hours afterwards, lead was detected in the milk by appropriate reagents.[2] In other secretions, substances can be detected, as sulphur in the cutaneous transpiration, and iodine in the nasal mucus. Coloring matters, as that of rhubarb, are well known to tinge the secretions, while madder enters into the bones. Volatile odoriferous principles, as of assafœtida, camphor, musk, and the volatile oils, enter the circulation, and are thrown off by the emunctories. Asparagin, oil of turpentine, and copaiba are thrown off by the kidneys, and perceived in the urine.

It is not necessary to extend the record of facts in the general way that has been done. At the present time the direct evidence is complete with respect to the introduction of matters, medicinal or other, into the circulation, and few individuals can be found who doubt its truth. The history of a very large number of articles of the Materia Medica presents observations with respect to their action, which confirm the doctrine, that this is extensively the mode in which their effects are produced. In connection with the facts that have been stated, there are other circumstances which can here be appropriately adverted to in confirmation of them.

Not only have substances been detected in the blood and the secretions, but these have acquired the power of affecting other beings in the way peculiar to the substance taken. Thus, narcotism or purgation can be induced in the infant from the milk of the mother or of the nurse when narcotic or purgative articles have been freely taken. The urine in the same way acquires medicinal or poisonous properties. Runge found that the urine of rabbits fed with belladonna, stramonium, and henbane caused dilatation of the pupil, when applied to the eye of another animal.[3] That the urine is so impregnated, has been confirmed by Dr. Letheby.[4] Intoxicating articles affect the urine.[5]

The blood of an animal under the influence of poison has been found to possess poisonous properties. An experiment of this kind has been made by Vernière with the extract of nux vomica that was introduced

[1] Zeitschrift für Physiologie. Bd. ii. p. 47. Pereira, Elements of Mat. Med. Amer. ed., i. 150; also Müller, Elem. of Phys., Baly, i. 638.
[2] Treatise on Poisons by Alfred Taylor, M. D., p. 444. Amer. ed., 1859.
[3] Orfila, Traité de Toxicologie, ii., 266. 4th ed.
[4] London Med. Gazette, Jan., 1847.
[5] Pereira, Elem. of Mat. Med., i. 152. Amer. ed.

into a wound of the paw of an animal, after the venous circulation, but not the arterial, had been checked. The blood taken from a vein between the wound and the ligature was poisonous to another animal, but could be withdrawn, so as not to affect the animal upon whom the experiment had been made.[1]

Messrs. Morgan and Addison have endeavored to show that the introduction of poison into the blood by absorption was not necessary for fatal effects to be manifested. They have undertaken to exhibit further that the blood of an animal that has been poisoned is not injurious to another animal. Their experiments upon dogs have been deemed so manifestly inconclusive that it is unnecessary to cite the details.[2]

The flesh of animals has been known to possess deleterious properties. Cases are not uncommon, and several are on record, where the flesh of birds that had lived on Kalmia latifolia produced poisonous effects in those eating them.

Medicinal substances, when thrown into the vessels, produce the same effects as when they are taken into the organs. The experiments of Magendie and others fully confirm this statement. In order to produce vomiting, that physiologist employed tartar emetic thrown into the circulation.

In Dr. Hale's experiment of throwing castor oil into his veins, purging ensued. Strychnia induces convulsions, opium produces narcotism, and so of the other articles. With respect to poisonous substances, the fact may be noticed that Fontana, when experimenting with the view of determining the effects of the venom of the viper upon the blood, injected it directly into the jugular veins of the rabbit, and in several of the experiments the animal died in a few minutes.[3]

There is another circumstance confirmative of the fact of introduction into the circulation, and that is the dependence upon the state of the circulation for the speedy or retarded passage of articles that can enter it. When the circulation is full and active, the absorption of substances is impeded; but when it is depressed, absorption is more rapid. Magendie's experiments clearly exhibit this dependence upon the state of the circulation. After the abstraction of blood, medicinal articles more readily enter the circulation, and exhibit their effects. The physiologist named found that a dog, from whom a large quantity of blood had been drawn, died more rapidly from the impression of strychnia; and similar results have been arrived at by the experiments of Edwards. This is an established law, which must be estimated in therapeutics, as is shown in the speedy salivation that so constantly follows the exhibition of mercurials, when a patient with an active circulation has been bled, or is previously reduced. Too great languor of the circulation is another cause of impeded entrance into the bloodvessels, and hence the difficulty when the circulation is static or congested. If the difficulty of introduction be mechanical, by removing the obstruction prompt medicinal

[1] Journal de Progres des Sciences Méd., 1829. Christison, Treatise on Poisons. 4th ed., p. 14.

[2] Essay on the Operation of Poisonous Agents, Lond. 1829. See also Pereira's Elements Mat. Med., vol. i. p. 160. Amer. ed.

[3] Traité sur le venim de la vipère, &c., i. 263.

action will follow as a consequence; or if absorption be slow or impeded by debility, the employment of stimulants will answer the same purpose. I have seen a patient salivated, who had taken calomel without effect, in a depressed state, as soon as reaction was fairly established by the administration of carbonate of ammonia. A mode of preventing the introduction of poisonous substances is to retard the circulation by mechanical means, as by cups or ligature; and counteracting their impression, by stimulating the sanguine system, is a successful practice if venomous poisons have been inserted into the flesh.

The fact that absorption does take place having been indubitably established by the experiments of physiologists, the next consideration is the manner of its accomplishment. Upon this subject much difference of opinion has existed. It is not necessary to enter into a history of the controversy that has taken place between the most eminent men of the profession with respect to the routes by which substances are admitted into the circulation. It will be sufficient to state that in ancient times the veins being alone known were supposed to be the means of introduction, and when the lacteal and lymphatic absorbents were detected and brought fully into notice, they were considered as the true absorbing vessels.[1]

Experiments have of late years conclusively shown that both the veins and the lymphatics are concerned in the act of absorption, and the further researches have been pushed, the more clear does it become that a difference of capability exists in the performance of the function.

Magendie has been the especial advocate of the doctrine that foreign substances are introduced by the veins, and in this way, consequently, medicinal articles are carried into the circulation. In addition to the experiments detailed, he and Delille exposed a convolution of the intestine of a dog, in which the lacteals were caused to become distended by previous feeding. The intestine was included by ligatures, with from 15 to 16 inches between them, and of this portion the lacteals were ligated. The only means of communication by the circulation were the arteries and veins. They then injected two ounces of decoction of nux vomica into the included knuckle of intestine, and closed the orifice. Symptoms of poisoning ensued in six minutes.[2]

In order to obviate the objection that might be urged against the experiment first detailed, where the artery and vein were isolated, that the effect of the poison might take place through the nerves or lymphatics, the vessels were divided in a subsequent experiment; and quills substituted as the means of connection, but without altering the result.

Sir B. Brodie tied a ligature round the thoracic duct of a dog, just before it perforates the angle of the left subclavian and jugular veins. He then made two wounds in the left hind leg, and introduced some woorara powder into them. In less than a quarter of an hour the animal became affected with the usual symptoms, and died in a few minutes afterward.[3]

Pannizza performed an experiment similar to that of Magendie. He

[1] The discovery of the lacteals by Asellius occurred in 1622.
[2] Elements of Physiologie, Milligan's trans., p. 358.
[3] Physiological Researches, p. 64.

rapidly but carefully removed all of the lymphatic vessels and nerves of the intestinal fold, and prussic acid being poured in quickly destroyed the animal.[1]

The results that have been detailed are positive in their character and sufficiently conclusive, yet they have been verified by those of an opposite kind. Segalas tied the bloodvessels or veins of a portion of the intestines, the lymphatics being uninjured, and was then unable to kill a dog, even in an hour, by means of the poison introduced into the intestine.[2]

Pannizza performed an experiment similar to that of Segalas. Having made an incision ten inches long in the belly of a horse extended on the ground, he drew out a fold of intestine, in which arose several small veins, which, after a short course, terminated in a single very large mesenteric trunk, before any small veins from the glands had emptied themselves into it. The fold nine inches in length was tied by a double ligature in such a manner that it could receive blood by a single artery only, and could return none to the heart, except through the venous trunk. An aperture was then made in the fold for the purpose of admitting a brass tube, which was so fastened by thread that the substance to be introduced could not touch the incised edge of the opening. A ligature was then passed under the vein receiving the blood from the fold; this ligature was tightened, and in order that the circulation should not be stopped, the vein was opened to allow the escape of the returning blood. Hydrocyanic acid was introduced through the tube into the fold of the intestine, and the collected blood was found to contain it, but the animal presented no symptoms of poisoning, notwithstanding the nerves and the lymphatics remained untouched.[3] In another experiment Pannizza, instead of tying and opening the venous trunk where the small veins discharged themselves, merely compressed it at the moment the hydrocyanic acid was introduced. There were no symptoms of poisoning, but shortly after the removal of the pressure, symptoms of poisoning appeared, and the vein being opened, the contained blood was found to be impregnated with the acid.

Dr. Blake performed the experiment of tying the vena portæ, and then introducing poison into the stomach, when it failed to act.[4] Pereira states "that the cardiac orifice of the stomach should be tied to prevent the escape of the poison into the œsophagus. When this precaution is adopted, a ligature placed on the vena portæ prevents the action of poisons taken into the stomach, as I myself have witnessed."[5]

Although it has been clearly established that articles enter the circulation by means of the veins, it is not to be understood that these constitute the sole route. It has been determined that other matters besides those of pure chyle are capable of entering the lacteals, and that absorption takes place by the lymphatics.

Tiedemann and Gmelin performed numerous experiments with coloring matters and salts introduced into the stomach, and although as a

[1] Lectures on the Physiological Phenomena of Living Beings. By Carlo Matteucci. Am. ed., p. 84.
[2] Müller, Elements of Phys., i. 255.
[3] Matteucci, Lectures, &c., p. 84.
[4] Edinburgh Med. and Surg. Journ., vol. liii. p. 45.
[5] Elements of Mat. Med., vol. i. p. 151. Am. ed.

general rule the articles in question were not detected in the chyle, but in the blood and urine, yet, in some notable cases, the reverse was the case; thus, sulphate of iron, ferroprussiate of potassa, and sulphocyanate of potassa were found in the chyle. Foderé, Schrœder, and Poisseuille all detected ferroprussiate of potassa in the lacteals.[1]

The labors of the Committee of the Academy of Medicine of Philadelphia, appointed for the especial purpose of determining the questions connected with absorption, were confirmative of the statements of Magendie, with the exception of the hypothesis of *non-absorption* by the lacteals and lymphatics.[2] They showed the possibility of introduction by means of the vessels mentioned, and that even poisoning might take place slowly when the article, nux vomica, was introduced into the intestines, although the vena portæ was tied. It requires a longer time for such articles as can be introduced by the lymphatics to produce their effects.

That absorption can take place from the minute ramification of the vessels having been placed by experiment beyond a doubt, the point now to be determined is, in what manner is the introduction of substances accomplished, and what are the forces which conduce to it.

It is stated by Matteucci that "there is no fact which demonstrates the existence of free extremities in the ramifications of bloodvessels, which everywhere present a very close and continuous reticulated structure. The arterial network is uninterruptedly continuous with the venous network, which in general preponderates over the former. The lymphatic system, likewise, never terminates by independent extremities, but everywhere presents the aspect of a very fine and close trellis-work. Anatomy, which agrees with physiology, leads us to the conclusion that the first part of absorption can be effected only by the aid of the porosities proper to the structure of organized bodies. In this way the absorbed matters arrive at and are mixed with the blood, the chyle and the lymph, and are carried away by these liquids and are distributed over the body." The above quotation is the embodiment of the doctrine now entertained by physiologists, and as there are no defined perforations or mouths to the vessels admitted by them to exist, it is necessary to have recourse, for the purpose of explanation, to the principle that exists in connection with all porous substances, viz., that of physical imbibition, or, as it has been termed when presented in animal tissues, by Dutrochet, *endosmose*, or *endosmotic action*. The reverse of this, or exudation, has been called *exosmose*.

It may be remarked that Magendie and Foderé rejected the idea of absorption by any other mode than by imbibition. The latter, in his researches upon exhalation and absorption, calls the first transudation, and the latter imbibition, which his experiments prove.[3] The idea of exhalant vessels in connection with that of open absorbent vessels has been abandoned. Porosity is a characteristic of living as well as of

[1] See Müller, vol. i. p. 257.

[2] The Committee consisted of Drs. Harlan, Lawrence, and Coates, and upon the two latter the experiments mainly devolved. Philadelphia Journal of Medical Science, No. 6, 1823.

[3] Recherches Experiment. sur l'Exhalation et l'Absorption. Read before the Institute, and published, Paris, 1824.

inanimate matter, and, as remarked by Matteucci, it will be readily admitted that capillary actions must exercise great influence over the functions of the tissues of animals and vegetables, when we reflect that the interstices and the capillary tubes of the tissues have a diameter of from $\frac{1}{100}$ to $\frac{2}{100}$ of a millimetre (from $\frac{1}{2540}$ to $\frac{1}{5080}$ of an inch).[1]

It must be understood that capillary action is not the cause of absorption in living tissues, but that it is at the foundation of the power which exists of absorption, and conduces to it by affording the means by which fluids can enter through the interstices of the tissues. There are other forces operative, which must be taken into the calculation in the endeavor to explain the process.

Endosmosis.—The simplest definition that has been given of endosmose is that "it is the mutual action of two liquids on each other when separated by membrane."[2] When endosmose takes place in the living body, the animal tissues are penetrated by fluids (either simple or charged with soluble matters) which are brought in contact with them; and all animal membranes are more or less pervious, so as to permit the transmission of fluid or aid in its accomplishment. This, however, takes place in accordance with laws which are determined by the character of the fluids and the structure of the tissue.

The attraction of denser fluids for those of less specific gravity or consistence renders the porosity of animal membrane most conspicuous. Thus, if a section of fresh chicken's intestine be tied at one end, then half or three-quarters filled with a solution of sugar, and after being tied at the other end, thrown into a vessel of clear water, in a little time it will become distended. The water passes into the intestine in consequence of the attraction of the sugary solution for it. It was found by Dutrochet that endosmose is more obvious, and its velocity greater in proportion as the density of a liquid exceeds that of another; and moreover, increase of temperature within certain limits not injurious to the membrane, augments the rapidity of the endosmotic current. Of the substances experimented with by Dutrochet, albumen possesses the greatest amount of endosmotic force, sugar is next in order, and after these gum and gelatine. Not only is the rapidity of introduction to be regarded, but the force with which it is accomplished. It was ascertained that the force with which syrup of sp. gr. 1.3 acts upon water is equal to $4\frac{1}{2}$ atmospheres.

Although superior density of one fluid over another would seem to determine the direction of the endosmotic current, this is not invariable, it is not always from the lighter to the denser liquid; thus, alcohol which has a less specific gravity than water, is the fluid to which water is directed.

That there must be an *affinity* and power of mixing between the fluids engaged in the operation is very certain, but there must also be a superior affinity between the interposed membrane and one of the fluids, or, in other words, for one of them the membrane must possess a greater imbibing tendency, and hence it is that water passes through to be mingled with the alcohol. The alcohol attracts the water because the membrane has the most affinity for the latter. Dilute alcohol kept in a bladder becomes more concentrated, the water alone evaporating.

[1] Lectures, p. 31. [2] Ibid., p. 45.

The endosmotic action through membranes varies according to the surface which is exposed to the entering liquid. If the most porous surface is placed in contact with it, the entrance of the fluid will be promoted. If the reverse occurs, the introduction will not be so active; and should the more porous surface be brought in contact with alcohol or coagulating solutions, the probability is that a restraining influence will be exerted from a change in the surface by the action of such fluids.

Mucous membrane readily permits the passage of liquids. That of the stomach of the dog, the cat, and the lamb, and of the bladder of the ox, were employed by Matteucci and Cimma in their experiments. With the different solutions that were used as the attracting fluids, the position favorable to endosmotic action was from the interior to the exterior surface, and between the two there was greater variation than with the skins of the eel, the frog, or torpedo.

The following conclusions were arrived at from the experiments of Matteucci :—

1. The membrane interposed between the two liquids is very actively concerned, according to its nature, in the intensity and direction of the endosmotic current.

2. There is in general for each membrane a certain position in which endosmose is most intense, and the cases are very rare in which with fresh membrane endosmose takes place equally, whatever be the relative position of the membrane to the two liquids.

3. The direction which is most favorable to endosmose through skins is usually from the internal to the external surface, with the exception of the skin of the frog, in which endosmose, in the single case of water and alcohol, is promoted from the external to the internal surface.

4. The direction favorable to endosmose through stomachs and urinary bladder varies with different liquids much more than through skins.

5. The phenomenon of endosmose is intimately connected with the physiological condition of the membranes.

6. With membranes dried or altered by putrefaction, either we do not observe the usual difference ensuing from the position of their surfaces, or endosmose no longer takes place.

Exosmosis.—While an attraction exists on the part of a denser fluid for one of less specific gravity, through membrane, the denser fluid may pass to the lighter one and alter its specific gravity, or at least the material constituting in solution the denser fluid may pass out and augment the specific gravity of the lighter. Thus while water passes through the parietes of a fowl's intestine to augment the sugary solution contained by it, the sugary fluid itself will pass outwards to mingle with the water, and this to the greater extent as the intestine becomes distended.

An experiment the reverse of that detailed in illustrating endosmose may be performed with the intestine of the fowl. If a section be completely filled with water and thrown into a solution of sugar, the intestine will be partly emptied by the abstraction of the water, while the remaining water contained in it will assume the taste of sugar and greater specific gravity. If a portion of the intestine of a fowl be filled with a watery solution of gum Arabic and rhabarbarin, and when tied close, laid in a vessel of water, the intestine becomes tensely distended and the rhabarbarin exudes from it. Similar experiments may be performed with albumen or saline substances.

Dutrochet supposes that there is a stronger in-going current, the endosmotic, and a weaker out-going current, the exosmotic. It has been shown by Liebig that saline, and inferentially other matters, do not simply pass through membrane without a certain amount of water, or, in other words, that these particles alone do not pass, but that there is an actual current.[1] According to experiment, however, the force of imbibition or exudation is determined in a measure by the character of the interposed membrane, or the nature of the surface exposed to either of the liquids, and it is to be understood that it is not the direction of the current invariably inwards which constitutes it endosmotic, but the greater strength and amount over the reverse or exosmotic current.

It must be borne in mind, when considering the subject of absorption as a mere physical act, that not only is there a difference in the permeability of membranes, which, from their affinity for the fluids, determine the direction of the current, but there is a tendency in substances in solution to diffuse themselves through fluid by molecular attraction, and thus establish a uniformity of saturation.[2] This is facilitated or retarded by membrane, the surfaces of which may be unequal in the property of permeability. Thus, while the inner surface of the skin of the frog will allow water to pass to a saline solution without much lowering the specific gravity by the exit of the salt, on the contrary the exterior surface, when in contact with the water, while to the same extent not permitting its passage, will allow a greater transfer of the saline to the water. According to the law of diffusibility of saline bodies through fluids, in both cases there exist endosmotic and exosmotic action; in the first instance endosmose preponderating, and in the second exosmose.

Independently of the nature of surface contact, experiment shows that the endosmotic influence of saline solutions is feebler than that of many other articles, while exosmose of saline bodies is more decided and readily effected.

Permeability exists both in dead and living tissues. An illustration of the latter is recorded by Prof. J. K. Mitchell in his paper on the "Penetrativeness of Fluids."[3] He there states that while engaged in investigating Magendie's theory of venous absorption, he colored the diaphragm of a living cat blue by placing a solution of prussiate of potassa on one side, and that of sulphate of iron on the other.

The absorption of medicinal articles into the vessels and structures of the animal system can be accounted for upon the principle of endosmotic action. The blood which circulates in the capillary vessels is rich in albumen, while it contains salines and other attracting materials having an affinity for water and with it such substances as it holds in solution. The power of absorption varies in the several tissues, depending upon their vascularity and physical structure, and hence the disparity that is exhibited among them. There is, moreover, an element to be considered in appreciating the rapidity of absorption, which is the

[1] On the Motion of the Juices in the Animal Body, by Justus Liebig, M. D., Am. ed., p. 165.

[2] Report on the Laws according to which the mixing of Fluids and their penetration into permeable substances occur, with special reference to the processes in the Human and Animal Organism, by Julius Vogel, Cavendish Society's Works, 1848, p. 89.

[3] American Journal of Medical Sciences, Nov. 1830.

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rapidly as to preclude the possibility of their being absorbed. This point in question has been carefully examined by Mr. Blake,[1] who arrives at the conclusion that the rapidity of the action of a poison was in proportion to the rapidity of the circulation. He found that an interval always more than nine seconds, elapses between the introduction of poison into the capillaries or veins and the first symptoms of its action. In dogs, a substance which does not act on the capillary tissue passes from any part of the vascular system back to the same part again in from twelve to twenty seconds. Prof. Hesing, of Stuttgard, found that the time which a solution of ferrocyanide of potassium, injected into the jugular vein, requires to reach that of the opposite side, was in various experiments from twenty to thirty seconds.[2] With reference to prussic acid, Dr. H. Meyer determined by his experiments that killing by this poison, although a rapid process, is by no means so instantaneous as formerly supposed, generally only after the lapse of one minute and a half, and it is well known that this is one of the most rapid of poisonous articles.[3] As has been shown where sudden death occurs, it is from an ordinate stimulation taking the form of shock, and brought to bear upon the central nervous masses. The argument, therefore, against the introduction of sedative poisons, based upon the time of their operation has no intrinsic force.

[1] Edinburgh Med. and Surg. Journ., vol. 53. p. 42.
[2] Pereira, Elements of Mat. Med., vol. i. p. 154.
[3] London Medical Times, vol. ix. p. 432.

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